A

Natural Hiſtory:

Containing

Many *not Common* OBSERVATIONS:

Extracted out of the beſt

Modern Writers.

BY

Sir *Thomas Pope Blount*, Baronet.

Fœlix qui potuit Rerum dignoſcere Cauſas.
Virgil.

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TO THE

RIGHT HONOURABLE

Henry Lord *Capel*,

Baron of *Tewkesbury*, and one of their Majesties Most Honourable *Privy Council*.

My Lord,

DEDICATIONS are in this Age grown so much in fashion, that an *Author* who appears without one, seems but an *uncouth* sort of *Animal*; and therefore since Necessity for-

ces me to a Compliance with this Cuſtom, I hope Your *Lordſhip* will vouchſafe to Honour this *ſmall Piece* with Your Protection. *My Lord*, ſhould I follow the common courſe of Dedications, I might here have a fair opportunity of Celebrating your many *Virtues*; here (indeed) is Field-Room enough to range in, and it is eaſie to be Eloquent upon ſuch a Topick; but ſince *Nature* has by no means fitted me for *Panegyricks*, nor is there any need of *Proclaiming* that which every one already knows; I ſhall now wholly forbear any thing of this kind.

My

My Lord, what I now (with all deference) preſent to Your *Lordſhip*, is not any ſuperficial, ſlight Notion of my own, but that which is here tender'd, is a NATURAL HISTORY, drawn from the Writings of the *Beaux Eſprits*, or the greateſt Wits of the Preſent Age upon theſe ſeveral Subjects, ſo that I queſtion not but Your *Lordſhip* will meet with ſome *Remarques*, that may be Entertaining, Uſeful, and not Common. And if upon any Account it be acceptable to Your *Lordſhip*, I have then fully attain'd my End; ſince the ut-

most I can pretend to, is but a *Pepper-Corn Acknowledgment* from,

Your Lordship's

Most Devoted,

And Obliged

Humble Servant,

Tho. Pope Blount.

THE PREFACE.

WHoever Surveys the Curious Fabrick of the UNIVERSE, can never imagine, that so Noble a Structure should be Fram'd for no other Use, than barely for MANKIND to live and breath in. It was certainly the Design of the great Architect, that his Creatures should afford not only Necessaries and Accommodations to our Animal part, but also Instructions to our Intellectual. Every Flower of the Field, every Fibre of a Plant, every Particle of an Insect, carries with it the Impress of its Maker, and can (if duly consider'd) read us Lectures of Ethicks or Divinity. The deeper insight any Man hath into the Affairs of NATURE, the more he discovers of the Accurateness, and Art, that is in the Contexture of Things: For the Works of God, are not like the Compositions of Fancy, or the Tricks of Juglers, that will not bear a clear Light, or strict Scrutiny; but their Exactness receives advantage from the se-

vereſt Inſpection; and he admires *moſt, that* knows *moſt. How unreaſonable (then) are thoſe Men, who will not herein allow us the uſe of our RATIONAL FACULTIES, but with great Fury and Zeal declaim againſt the Study of NATURE, as a thing moſt dangerous and pernicious; telling us, that too ſtrict an Enquiry into the Works of NATURE, does often terminate in a Spirit of* Atheiſm. *But whoever He was that firſt broach'd this Doctrine, I am ſure the true RELIGION is little beholden to him for it; for inſtead of Obeying the* Jewiſh Law, *which forbids us to offer up to* God *a Sacrifice that has a Blemiſh;* He *has only aſſign'd to* Religion *thoſe Men, who have the greateſt Blemiſh of* Humane Nature, *even a defect in their* Knowledge *and* Underſtanding. *Indeed, it cannot but juſtly provoke any Man of an Ingenious temper, to hear after what manner ſome Men inveigh againſt REASON, calling it the Step-Mother of FAITH, and a proclaim'd Rebel againſt God Almighty; and ſuch declar'd Traitors, as dare harbour it, or ſo much as appear in its defence. Methinks theſe Sort of Men Act every whit as fooliſhly, as* He *who in great wrath ſhould break his* Perſpective, *only becauſe it could*

could not bring home to his view the moſt remote Objects; and are as unjuſt as Jacob *had been, if he had divorc'd from* Leah, *becauſe ſhe was* Tender-Ey'd. *Ever ſince* FAITH *and* REASON *have been by* Divines *ſet together by the Ears, the brutiſh Multitude conclude thoſe who are moſt* REASONABLE *to be leaſt* RELIGIOUS; *and the greateſt* SPIRITS *to be the leaſt* SPIRITUAL: *A conceit moſt inconſiſtent with that* Divine Parable, *wherein Thoſe who received the* Many Talents, *improv'd them to the beſt advantage, whilſt* He *who had* but One, *laid it up in a* Napkin. *Nor is it probable, that* God *would chuſe* low Shrubs, *and not* tall Cedars, *for the Building of his Glorious Temple. And beſides, it is remarkable, that* God *in the* Old Law *refus'd to accept the Firſt-Born of an Aſſe in Sacrifice, but not of any other Creature. We have Reaſon* (then) *to think, that no Perfection is to be valued at ſo high a Rate, as a true Freedom and Ingenuity of Mind; 'Tis this that diſtinguiſhes* Churches *from* Heards, *as a Modern Author expreſſes it. And thoſe Men who have laid aſide the free and impartial uſe of their* REASON, *are juſt as fit for* RELIGION, *as Sheep and Oxen; for they differ only*

in

in this, that the One *are* Brutes *without* REASON, *and the* other *Brutes with it. How could the* Scythian *have Sacrific'd* RATIONAL *Beings, had he not firſt Sacrific'd his own* REASON? *Or the* Egyptian *adored* IRRATIONAL *Creatures, had not He himſelf been one?* Onions *could never have been* Deities, *if* Egyptians *had been* Men; *but when* REASON *was once baniſh'd the Temples, no wonder if* Folly *and* Superſtition *commenc'd* RELIGION; *a* Stock *might be a* Deity, *when the* Prieſt *was no more. Thus then we ſee, that unleſs we make uſe of our* RATIONAL *Faculties, we preſently ceaſe from Acting like* Men, *nay,* We *do not ſo much in* our Kind, *as* Beaſts *do in* theirs, *who juſtly obey the Preſcript of their Natures, and live up to the height of that* Inſtinct *that Providence hath given them. But, alas! though every Man would be thought to be* ANIMAL RATIONALE, *yet how few are there who Act as if they really were ſo! inſomuch that it may be truly ſaid,* Humanum paucis vivit genus; *MANKIND is but preſerv'd in a few* Individuals; *The greateſt part of Men, like the* Serpent, *ly hiſſing and groveling upon the* Earth, *and their Souls are ſo fixed in that groſſer* Moity *of Themſelves,*

ſelves, their Bodies, *that nothing can Sublimate or Refine them. The numerous* Rabble *that ſeem to have the Signatures of* Man *in their* Faces, *are but* Brutes *in their Underſtanding, and have nothing of the Nobler part that ſhould denominate their Eſſences; 'tis by the favour of a* Metaphor, *we call them* Men, *for at the beſt they are but* Des-Cartes's *AUTOMATA, moving* Frames *and* Figures *of Men, and have nothing but their Outſides to juſtifie their Titles to Rationality.*

Now, having ſaid thus much, it remains only, that I apply my ſelf to another ſort of Men, and they are ſuch, who pretend to be wiſer and more knowing than the reſt of Mankind: Theſe, I know, will be apt to ſmile at, and deſpiſe many of the Subjects here treated of, as mean and trifling. What! Entertain ſuch brave Heros, *ſuch mighty* Dons, *with an inſipid Diſcourſe of PLANTS, INSECTS and REPTILES! away with them, this is an Impertinence not to be born with. But let theſe high-flown Topping* Sparks *ſwell and ſtrut as much as they pleaſe, I am ſure one, who may be allow'd to have a great deal more Wit than Themſelves, I mean the Wiſe* Solomon, *was of another Opi-*

nion;

nion; *for* he *thought it not beneath him to take notice as well of Abject* REPTILES, *as of* Lions, Eagles, Elephants, *and other noble* Animals; *nor did he only write of the tall* Cedars *of* Lebanon, *but alſo of that* Diſpicable Plant, *which grows out of the* Wall. Pliny *in his Treatiſe of* INSECTS *ſeems to be tranſported with an unuſual admiration of the Workmanſhip of* NATURE *in them*; Nuſquam alibi ſpectatiore Naturæ rerum Artificio; In nothing, *ſaith he*, is the Workmanſhip of *NATURE* more remarkable, than in the Contexture of theſe little Creatures. *And after a Wonder, not unworthy a* Philoſopher, *He concludes*, Rerum Natura nuſquam magis quam in *Minimis* tota eſt, *NATURE* in her whole Power is never more wholly ſeen than in her ſmalleſt Works. *And from this very Opinion, in all probability, did* Epicurus *frame his Doctrine of* ATOMS. *The* Gods, *ſaith* Ariſtotle, *are as well in the* leaſt INSECTS, *as in the moſt* bulky ANIMALS; *and therefore we ought not to deſpiſe theſe* little Creatures. *For on the contrary, as in* Art, *the leſs room a* Picture *takes up, the more it is eſteem'd*; *ſo in* Nature, *the leſs Volume Things are in, the more*

worth

worthy they are of Admiration. Much to the ſame Effect ſaith that Noble Philoſopher, Mr. Boyle, *viz.* That Gods Wiſdom appears not leſs in leſſer Creatures, than in the larger; and that there is none of them ſo little, but would deſerve a great deal of our Wonder, did we attentively enough conſider it. Hiſtory *tells us, that* Apelles *was diſcover'd by the skillful* Protagoras, *by drawing ſo fine and ſlender a Line, that* Protagoras, *by being ſcarce able to diſcern it, diſcover'd it to have been drawn by* Appelles; *even ſo Almighty God, in theſe* little Creatures, *does often draw ſuch exquiſite and delicate Lines and Traces, that nothing leſs than the* Divine Pencil *could ever have fram'd the like: How can any thing be more ſtupendious and wonderful, than to ſee in theſe* little Creatures *all the Perfections of the* largeſt Animals? *They have the ſame Organs of Body, multiplicity of Parts, variety of Motions, diverſity of Figures, and ſeverality of Functions with thoſe of the largeſt Size; And that which is ſtill more wonderful, is, that all theſe in ſo narrow a room do neither interfere, nor impede one another in their ſeveral Operations.*

And

And now, that I may not be too tedious, I will close this PREFACE with a word or two, in Answer to one Objection, that this following Piece *may seem liable to. I know many will think it very absurd and preposterous, that I should undertake to write a NATURAL HISTORY in so small a Volume, and Contract a Subject of the largest Field into so narrow a Compass. But in Answer hereunto I have this to say; that (indeed) had I taken in all things that properly relate to* Natural History, *instead of an* Octavo, *I could easily have swell'd it into a* Folio; *but I consider'd, that by reason of the present Taxes men now are forc'd into good Husbandry, and that the laying out much Money in Books is by most men thought an unnecessary Charge fit to be retrench'd; wherefore I resolv'd to make my self as* easie *to the* Reader *as I could, by not being too* chargeable *to him; and this I thought was best to be done, by singling out such* Subjects *only, as I knew contained in them matters of the greatest curiosity. So that (in a word) my chief Design is, that by the help of such a* Vade Mecum, *Gentlemen may entertain themselves upon these following* Subjects, *without too great an Expence either of Time, or Money.*

The

The several Subjects here treated of, are, as follow.

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A
Natural Hiſtory.

Obſervations concerning MUSK.

THe MUSK-Cat is a Creature almoſt like a *Goat*, bred in the Kingdom of *Pegu*, in the *Indies*; as alſo in *Egypt*, and other places. It has been brought into our *Northern* Countries, but through the diſagreeableneſs of the Climat, it will not with us yield any MUSK, nor will it live long.

Schroder ſays, that MUSK is an Excrement, or matter included in a *Ciſtis* or *Bladder* about the Navel, while the Creature is full of Venery. When this *Impoſthume* ſwells much, and puts him to Pain, he rubs it againſt Stones or Shrubs,

and breaks it, upon which the Matter falling it ſticks, and, by Virtue of the Sun-beams, it becomes ſweet-ſcented MUSK.

Monſieur Thevenot tells us, That in the Province of *Azmer*, belonging to the *Great Mogul*, there is a Beaſt, like a *Fox* in the Snout, which is no bigger than a *Hare*: The Hair of it, is of the Colour of a *Stags*, and the Teeth like to a *Dogs*. He ſays, it yields moſt excellent MUSK; for at the Belly it hath a Bladder full of corrupt Blood, and that Blood maketh the MUSK, or is rather the MUSK it ſelf; which they take from it, and immediatly cover the place where the *Bladder* is cut with Leather, to hinder the Scent from evaporating: But after this Operation is made, the Beaſt is not long-liv'd.

Monſieur Tavernier, in his Travels in *India*, ſays, That the beſt ſort, and the greateſt quantity of MUSK, comes from the Kingdom of *Boutan*, from whence they bring

it

it to *Patna*, the chief City of *Bengala*, to truck it away for other Commodities: And that all the MUSK which is Sold in *Perſia*, comes from thence: And that the MUSK-Merchants had rather deal with you for *Coral* and *Tellow-Amber*, than for *Gold* or *Silver*; in regard the other is more in eſteem among the Natives where they live.

Tavernier alſo tells us, That after they have kill'd the Creature, they cut off the *Bladder* that grows under the Belly, as big as an Egg, nearer to the Genital parts, than to the Navel: And that then they take out the MUSK that is in the *Bladder*, which at that time looks like Clotted-Blood.

He obſerves to us, That this Creature is not to be found in 65 degrees, but in 60 there are vaſt Numbers, the Country being all over cover'd with Forreſts. But he ſays, that in the Months of *February* and *March*, after they have

endur'd a ſharp Hunger, by reaſon of the great Snows that fall where they breed, Ten or Twelve Foot deep, they will come to 44 or 45 degrees to fill themſelves with Corn and new Rice. And then it is that the Natives lay Gins and Snares for them, to catch them as they go back: Shooting ſome with Bows, and knocking others o'the head. Nay, he ſays, ſome have aſſur'd him, That they are ſo lean and faint with Hunger at that time, that one may almoſt take them running

He alſo informs us, That none of theſe Creatures have above one *Bladder*, no bigger than a Hen's-Egg, which will not yield above half an Ounce of MUSK; and that ſometimes three or four will not afford an Ounce; and yet what a world of MUSK is bought up!

There are three ſorts of MUSK, Black, Brown, and Yellow; of which the *Firſt* is naught, the *Second* is good, the laſt beſt; which ought

ought to be of Colour like the beſt *Spikenard*, that is, of a deep *Amber* Colour, incloſed with one only Skin, and not one over another, as it is oftentimes to be ſeen; not over-moiſt, which maketh it weighty, but in a mean; having ſome Hairs like Briſtles, but not over many; clear of Stones, Lead, or other Traſh intermix'd; and of ſo ſtrong and fragrant a ſmell, that to many it is offenſive, and being taſted in the Mouth, it pierceth the very Brain with the Scent, and ought not overſoon to diſſolve in the Mouth, nor yet to remain very long undiſſolv'd in any hand; it muſt not be kept near to any ſweet Spices, leſt it loſe the ſcent. *PURCH. Pilgr. Vol.* 1. *Pag.* 389.

That the Teſticles of the Animal call'd MUSK-QUASS do ſmell ſtrong of MUSK, as Mr. *Joſſelin* in his Treatiſe of the Rarities of *New-England* affirms, is moſt certain; for a certain Perſon, (as you may ſee in the *Philoſoph. Tranſact.*) tells us,

That he hath known ſome of them kept a long time in ones Pocket, till they were become hard and black, and yet ſmelt as ſtrongly as at firſt; which, as he tells us, in his Opinion, was nothing inferior to the ſcent of that, which is commonly ſold for MUSK in the Shops. *PHILOSOPH. TRANSACT. Numb.* 127. *Pag.* 653.

The Learned and Ingenious Mr. *John Ray*, takes notice of two ſorts of *Inſects* that he hath ſeen, which ſmell of MUSK. The *one* is like the common *Capricornus*, or *Goat-Chafer*, which is mention'd by all *Naturaliſts* that Write of *Inſects*, and which ſmell ſo ſtrong of that Perfume, that you may ſcent it at a good diſtance as it flies by, or ſits near you. The *other* is a ſmall ſort of *Bee*, which in the *South* and *Eaſt* parts of *England* is frequently to be met withal, in Gardens among Flowers in Spring-time. *PHILOS. TRANSACT. Numb.* 74. *p.* 2220. Dr. *Lyſter*, (*Numb.* 76.) tells us, That

That he had obſerv'd theſe two *Inſects*, ſpoken of by Mr. *Ray*, and that he found they both ſmelt of MUSK in a high Degree. But Mr. *Willoughby* informing the *Dr.* that he had found the *Goat-Chafer* or *Sweet-Beetle* out of Seaſon as to that ſmell; he did thereupon ask what the *Dr.* had obſerv'd as to the time of their ſweeteſt and ſtrongeſt ſmelling? To which Dr. *Lyſter* anſwer'd, That he believ'd it to be at the time of the *Coit*, foraſmuch as at that time, when he took them highly perfum'd, he had obſerv'd the *Female* full of Egg. *PHILOS. TRANSACT. Numb.* 77. *Pag.* 3003.

Tavernier tells us, That in the Road from *Surat* to *Agra*, by the way of *Brampour* and *Seronge*, there is a Village, called *Navapoura*, where the *Rice*, which is leſs than other *Rice*, acquires the ſcent of MUSK by boyling; and that all the *Grandees* of the *Indians* eat no other.

There is a Plant, pretty common in *England*, *viz.* One kind of *Cranes-Bill*, call'd *Geranium Moſchatum*, that ſmells juſt like MUSK, eſpecially Morning and Evening.

There are ſeveral ways of adulterating MUSK. Sometimes with Roots of *Angelica*, a Kids Liver, or Goats Blood, *p. iiii.* of it to *i. p.* of MUSK. As alſo with *Nutmeg*, *Cinnamon*, *Cloves*, *Spikenard*, *ana*, mixt with MUSKED Roſe-Water. And ſometimes with *Benjamin*, *Storax*, and *Laudanum*.

The King of *Boutan* fearing that the Cheats and Adulterations of MUSK would ſpoil the MUSK-Trade, order'd that none of the *Bladders* ſhould be ſow'd up, but that they ſhould be all brought to *Boutan*, and there, after due inſpection, be ſeal'd up with his Seal. Yet notwithſtanding all the warineſs and care of the King, they will ſometimes cunningly open them, and put in little pieces of *Lead* to augment the Weight.

Obſerva-

Obſervations concerning CIVET, and CIVET-CATS.

THe CIVET-CAT is a Beaſt almoſt as big as a good Dog; it hath a ſharp Snout, ſmall Eyes, little Ears, and Muſtachios like a Cat; the Skin of it is all ſpotted Black and White, with ſome yellowiſh ſpecks, and hath a long buſhy Tail, almoſt like a Fox. It is a very Wild Creature; and I believe the bite of it would put a Man to no ſmall pain. There is great plenty of this ſort of Animals in *Æthiopia*, but eſpecially in the Kingdom of *Naria*, Tributary to the King of *Æthopia*; where the *Jews* keep them in great ſquare Wooden Cages, feeding them with raw Mutton and Beef, cut into ſmall pieces. When they would get from them that which is call'd CIVET, (and is the Sweat of this Beaſt, that ſmells ſo ſweet,) they make him go back with a Stick, which they thruſt

thruſt in betwixt the Bars of the Cage, and catch hold of his Tail; when they have that faſt, they take hold alſo of his two hind Legs, pulling him half out of the Cage by the Door, which falls down upon his back, and keeps him faſt there, then another opens a certain Cod of Fleſh, that theſe Beaſts have, which is ſhaped like a ſplit *Gyſern*, and with an *Iron-Spatula* ſcrapes all the Sweat off it within. The *Males* have that piece of Fleſh betwixt their Stones and Yard, which is like a Cats. The *Females* have it betwixt their Fundament and Privities; and it is emptied of the Sweat but twice a Week; each Beaſt yielding about a *Drachm* at a time. When that Sweat or Excrement is taken out, it is of a whitiſh Gray, but by little and little in ſome ſhort ſpace it turns to a very brown Colour. It ſmells very ſweet at a diſtance, but near hand it ſtinks, and cauſes the Head-ach. There are as many Kinds of CIVET-

Swear,

Sweat, as there are of CIVET-CATS, for it is more whitiſh, grayiſh, or yellowiſh, and drier, in ſome than in others, and yet they mingle all together. After all, it is in vain to think to have pure CIVET, for the *Jews* falſifie it; and if a Man imagine it to be pure, becauſe he has ſeen it taken from the Beaſt, he is miſtaken; for the *Jews* (before People cõme to their Houſes) rub the inſide of that piece of Fleſh, with a little Oyl, or ſome ſuch ſtuff, that ſo the Sweat and it together may make more Weight; but when no body is preſent, they take it out pure, and mingle it afterwards. The *Jews* hold this Beaſt very dear, the common rate for a CIVET-CAT being an hundred *Chequins*. *THEVENOT's Travels, Pag.* 239.

The Iſland of *Socotora* in the *Eaſt-Indies* does ſo abound with CIVET-CATS, that as *Purchas, Vol.* 1. *Pag.* 419. tells us, They often take them with Traps on the Mountains,

Mountains, and ſell them for Twelve Pence a piece, to ſuch as will buy them.

Dr. *Stubbes*, in his *Jamaica* Obſervations, ſaith, That CIVET-CATS will live above a Month without drinking, as he himſelf once try'd on one that he kept: But that if they drink once a Month, they will then yield more CIVET; and ſo, if they be fed with Fiſh. He alſo ſays, they Piſs much, as do Rabbets. *PHILOS. TRANSACT. Numb.* 36 *Pag.* 704.

The *Lord Bacon*, in his Natural Hiſtory, *Cent.* X. *Pag.* 204. ſays, That the ſmells of MUSK, *Amber*, and CIVET, are thought to further *Venereous Appetite*: Which, in his Opinion, they may do, by the *Refreſhing* and *calling forth* of the *Spirits*.

It is a certain Receiv'd Opinion, That CIVET put into Wine adds much to the ſtrength of it, and gives it a more Inebriating Quality.

CIVET

CIVET is adulterated with the Gall of a Bull, liquid Storax, and Honey.

Obſervations concerning AMBER.

GReat variety of Opinions hath there been concerning AMBER. *Some* think it to be a *Gum* that diſtils from Trees: *Others* tell us, it is made of *Whales* Dung; or elſe of their Sperm or Seed, (as others will have it,) which being conſolidate and harden'd by the *Sea* is caſt upon the Shore.

But *Peter Heylin* affirms, That AMBER is the Juice of a Stone, which grows like a *Coral* in *Poland*, in a Mountain of the *North Sea*, clean cover'd with Water; and that in the Months eſpecially of *September* and *December*, this Liquor is by violence of the Sea, rent from the Rock, and caſt into the Havens of *Poland*, and the Neighbouring Countries: *He* likewiſe affirms, that being taken out of the Water, it

it hardens like to *Coral*: And that beſides its Beauty, and the Quality it hath of burning like Pitch, and attracting Straws and Iron, like the *Adamant*, it is good for ſtopping the Blood, all kind of Agues, Falling Sickneſs, Dropſies, Stone, Colick, Weakneſs of Stomach, Head-Ach, and the Yellow Jaundiſe. *P. ET. HET L. Coſmog.*

Tavernier ſays, that AMBER is nothing but a certain Congelation made in the *Sea*, like a certain *Gum*: And that Yellow AMBER is only found upon the Coaſt of *Pruſſia* in the *Baltick Sea*, where the *Sea* throws it upon the Sand, when ſuch and ſuch Winds blow. He affirms, that the *Elector* of *Brandenburgh*, who is Soveraign of that Coaſt, Farms it out for Twenty Thouſand Crowns a Year, and ſometimes Two and Twenty Thouſand. And that the *Farmers* keep Guards on both ſides of the Shoar, in regard the *Sea* caſts it up ſometimes upon one ſide, and ſometimes upon

upon the other, to prevent the ſtealing of it. *TAVERN. Travels in* India, *Pag.* 152.

In *China*, when any great Lord makes a Feaſt, it is for his Grandeur and Magnificence to cauſe three or four ſeveral ſorts of Perfuming-Pots to be ſet upon the Table, and to throw into every one of them a vaſt quantity of AMBER; for the more it burns, and the bigger the pieces are, the more magnificent is the Entertainment accounted. The reaſon of this Cuſtom is, becauſe they adore the Fire; and beſides that the AMBER caſts forth a ſcent pleaſing to the *Chineſes*, there is a kind of Oyl in it, that flames after a more unuſual manner than other materials of Fire. This waſte of AMBER makes it the beſt Commodity that could be imported into *China*, if the Trade were free for Strangers. At preſent the *Hollanders* have engroſs'd all this Trade to themſelves, and the *Chineſes* come

come all to *Batavia* to buy it. *Ibidem.*

In the Kingdom of *Boutan*, Yellow AMBER is preferr'd before either Silver or Gold. *Ibid. Pag.* 153.

Monſieur Hevelius, in a Letter written to the Ingenious Mr. *Oldenburgh*, from *Dantzick*, *July* 5. 1670. Among other remarkable Things, gives him this account, *That* he had lately receiv'd from one, who lived on the ſide of the *Baltick* Sea, a piece of AMBER, which was ſo ſoft, that he had Printed his Seal on it: *That* it was yellowiſh, as moſt AMBER is; tranſparent, and burning as other AMBER; but its ſcent ſtronger, as if it were a kind of Glutinous *Bitumen*; and yet that it had been caſt up from the Sea the Year before, and was found among other pieces. *He* likewiſe in the *ſame Letter* informs him, That the Brother of this very Man, (who had ſent him this remarkable piece of AMBER,) a very credible Perſon, related at the ſame

ſame time, That he had been Maſter of a ſmall piece of AMBER, ſoft on one ſide, and very hard on the other, wherein lay buried a Fly. *PHILOS. TRANSACT. Numb.* 64. *pag.* 2061. *Numb.* 66.

There are ſeveral ſorts of AMBER, as white, yellow, pale and black ſpotted: The Shops know but two ſorts, the White and the Yellow: The White is beſt, being the more digeſted, and pure, burning ſweet: Then the Yellow, which is clear, and ſweeteſt when in Powder.

The beſt and pureſt ſort of AMBER, according to *Purchas. Vol.* 1. *pag.* 390. hath this peculiar Property, that, if put into a Bowl of Water, it will float on the top, and never ſink.

Obſervations concerning AMBER-GRISE.

AMBER-GRISE is a ſweet *Aromatick* Juice or Perfume ſo call'd. *Ætius* and *Simon Sethius* (Greek

Authors) affirm it to be a kind of *Bitumen*, iſſuing from Fountains, or Springs in the bottom of the Sea, and that by floating upon the Water it becomes hard, &c.

Juſtus Klobius, in his *Hiſtoria Ambræ*, reckons up no leſs than *Eighteen* ſeveral Opinions concerning this Noble Drug: But that which he embraces, is, That it is the *Dung* of a *Bird*, of the bigneſs of a Gooſe, found in *Madagaſcar*, the *Maldives*, and other parts of the *Eaſt-Indies*; and that theſe Birds, flocking together in great Numbers, as *Cranes*; and frequenting high Cliffs near the Sea-ſide, do there void their *Excrement*, from whence the *Sea* waſhes it, if it fall not of it ſelf into it.

There is another Opinion alſo among the *Eighteen*, to which *Klobius* ſeems well inclin'd, but yet dares not wholly ſtick to it; *viz.* That it is the *Excrement* of a particular ſort of *Whale*. But that which makes him not rely upon this

this Opinion, is, becauſe he obſerves, there is none of this *Drug* to be had in thoſe other places, where there is good ſtore of ſuch *Whales*.

The Houourable *Robert Boyle*, Eſquire, in a Letter to Mr. *Oldenburgh*, Dated *September* 13. 1673. after he had declar'd how little ſatisfi'd he was with the common receiv'd Opinions of AMBER-GRISE, at laſt affixes to the ſaid Letter an *Extract* out of a *Dutch Journal*, belonging to the *Dutch Eaſt-India* Company; which is in theſe words. "AMBER-GRISE "is not the *Scum* or *Excrement* of "the *Whale*, &c. but iſſues out of "the Root of a Tree, which Tree "how far ſoever it ſtands on the "Land, always ſhoots forth its Roots "towards the *Sea*, ſeeking the "warmth of it, thereby to deliver "the fatteſt *Gum* that comes out of "it: Which Tree otherwiſe by its "copious fatneſs might be burnt and "deſtroy'd. Where-ever that fat "*Gum* is ſhot into the *Sea*, it is ſo

" tough, that it is not eaſily broken " from the Root, unleſs its own " weight and the working of the " warm *Sea* doth it, and ſo it floats " on the *Sea*. *PHILOSOPH. TRANSACT. Numb.* 97.

Tavernier in his Travels in *India*, ſays, There is no Perſon in the World that knows either what AMBER-GRISE is, or where, or how it is produc'd. But the faireſt probability is, that it muſt be only in the *Eaſtern-Sea*: Though ſome Parcels have been found upon the Coaſt of *England*, and in ſome other parts of *Europe*. *He* ſays, that the greateſt quantity is found upon the Coaſt of *Melinda*, but more eſpecially in the Mouth of a River call'd *Rio de Sena*: That the Governour of *Mozambique* gets in the three Years of his Government above Three Hundred Thouſand *Pardo*'s of AMBER-GRISE, every *Pardo* containing 27 Sous of *French* Money: That ſometimes they meet with very large and very conſiderable

conſiderable pieces, *viz.* Of Thirty or Forty Pounds Weight. *TAVERN. Trav. in* India, *pag.* 152.

Sir *Philiberto Vernatti*, late Reſident in *Java Major*, ſays, *That* the beſt AMBER-GRISE in the World comes from the Iſland *Mauritius* in the *Eaſt-Indies*; and is commonly found after a Storm: *That* the Hogs can ſmell it at a great diſtance; who run like mad to it, and devour it commonly before the People come to it: *That* it is held to be a *Zeequal Viſcoſity*, which, being dried by the Sun, turns to ſuch a Conſiſtence as is daily ſeen. *He* mentions one *Iſaac Vigny*, a Frenchman, who had been a great Traveller in his time, who told him, that he had ſailed once in his Youth through ſo many of theſe *Zeequalen*, as would have loaded Ten Thouſand Ships; the like having been never ſeen; and that his Curioſity drove him to take up ſome of thoſe, which being dried

in the Sun, were perceiv'd to be the beſt AMBER-GRISE in the World. Sir *Philiberto*, ſays, He has ſeen one piece which the *Frenchman* kept for a *Memento*, and another piece he ſold for Thirteen Hundred Pounds Sterling: This being diſcover'd, They ſet Sail to the ſame place where theſe *Zeequalen* appear'd, and Cruiſed there to and fro, for the ſpace of ſix Weeks, but could not perceive any more. Where this place is ſcituated, Sir *Philiberto* ſays, He knows not; but *Monſieur Gentillot*, a French Captain in *Holland*, does. *SPRAT's Hiſt. of the R. S. pag.* 168.

There is AMBER-GRISE of four ſeveral Colours; *White*, *Gray*, *Red*, and *Black*; which comes according to the variety of Places or Regions where it is found; the *Gray* is preferr'd before all the other, and is known to be good, if when pricking it with a Pin, it ſends out a moiſture like Oyl.

The

The Black or White AMBERGRISE is adulterated with a little mixture of *Muſk* and *Civet* with *Storax*, *Laudanum*, and *Lignum-Aloes*, but may eaſily be known by the ſcent.

Obſervations concerning CORAL.

THere are ſeveral ſorts of CORAL, but the two Principal are the *White* and the *Red*; but the *Red* is the beſt. It grows like a Tree in the bottom of the *Sea*, green when under the Water, and bearing a White Berry; and when out, it turns Red. There is alſo a *Black* and *Yellow* kind of CORAL. Nay, *Linſchot* in his Deſcription of the *Eaſt-Indies*, ſays, That at the Cape of *Bon-Eſperance* there are Rocks on which CORAL grows of all Colours.

CORAL, but little valued in *Europe*, is highly eſteem'd in all the three other parts of the World.

There are three places where they Fiſh for it upon the Coaſt of *Sardigna.* That of *Arguerrel* is the faireſt of all. The ſecond place is called *Boza*; and the third is near the Iſland of St. *Peter.* There are two other places upon the Coaſt of *France*, the one near the Baſtion of *France*; the other at *Tabarque.* There is alſo another Fiſhery upon the Coaſt of *Sicily*, near *Trepano*, but the CORAL is ſmall, and ill-colour'd. There is another upon the Coaſt of *Catalogna*, near *Cape de Quiers*, where the CORAL is large, and of an excellent Colour, but the Branches are ſhort. There is a Ninth Fiſhery in the Iſland of *Majorque*, much like that near the Iſland of *Corſica.* And theſe are all the places in the *Mediterranean* Sea, where they Fiſh for CORAL; for there is none at all in the *Ocean. TAVERN. Trav. in* India.

They Fiſh for CORAL, from the beginning of *April* to the End of

of *July*; to which purpoſe there are employ'd above two Hundred Veſſels; ſome Years more, and ſome Years leſs. They are built all along the River of *Genoa*, being very ſwift. Their Sails are very large for more ſwiftneſs, ſo that there are no Gallies can reach them. There are ſeven Men and a Boy to every *Barque*. They never Fiſh above forty Miles from the Land, where they think there are Rocks, for fear of the *Pyrats*, whom they eaſily eſcape through the nimbleneſs of their Veſſels. *Ibidem.*

Monſieur Chapuzeau, in his Hiſtory of the *Riches* of the *Eaſt* and *Weſt-Indies*, ſays, That the manner of Fiſhing for CORAL, is with two big Beams of Wood, laid croſswiſe, with a good piece of Lead on the middle, to make it ſink, caſting about it courſe Hemp, careleſsly twiſted, and tying this Wood to two Ropes, whereof one hangs at the Stern, and the other at the fore-part of the Boat; and ſo letting

ting this contrivance fall into the Current, along the Rocks, where the Hemp being turned about, and engaged in the CORAL, there is occaſion ſometimes for a great many Boats to draw away the Inſtrument.

The common Opinion, That CORAL *is ſoft under Water, but waxeth hard in the Air*, hath been ſufficiently refuted by ſeveral. *Johannes Begvinus*, in his Chapt. of the Tincture of CORAL, undertakes to clear the World of this Error, from the very Experiment of *John Baptiſta de Nicole*, who was Over-ſeer of the Gathering of CORAL in the Kingdom of *Thunis*. This Gentleman, *ſaith he*, deſirous to find out the Nature of CORAL, and to be reſolved how it grows at the bottom of the *Sea*; cauſed a Man to go down no leſs than a Hundred Fathom, on purpoſe to take notice, whether it were *hard* or *ſoft* in the place where it grows. Who returning, brought in

in each Hand a Branch of CORAL, affirming it was as *hard* at the *bottom*, as in the *Air* where he deliver'd it. The ſame was alſo confirm'd by a Tryal of his own, handling it a Fathom under Water before it felt the *Air*.

Bætius, in his accurate Tract *de Gemmis*, is of the ſame Opinion; not aſcribing its *Concretion* unto the *Air*, but to the coagulating Spirits of *Salt*, and the petrifying Juice of the *Sea*, which entring the Parts of that Plant, overcomes its Vegetability, and converts it into a *Stony* ſubſtance. And this, *ſays he*, doth happen when the Plant is ready to decay; for all CORAL is not *hard*, and in many *Concreted* parts ſome parts remain unpetrified, that is, the livelier parts remain as *Wood*, and were never yet converted. *BROWN's Vulg. Errors.*

The *Lord Bacon*, in his *Natural Hiſtory*, tells us, there are very few Creatures that participate of the Nature of *Plants* and *Metals* both; but

but that CORAL is one of the neareſt of both Kinds. But the Ingenious *Monſieur Guiſony* ſeems to be of another Opinion, for he utterly denies CORAL to be a *Plant*, affirming that it is a meer *Mineral*, compoſed of much *Salt*, and a little *Earth*; and that it is formed into that ſubſtance by a precipitation of *divers Salts*, that enſues upon the Encounter of the *Earth* with thoſe *Salts*. *PHILOSOPH. TRANSACT. Numb.* 99. *pag.* 6159.

Of the Nature and Generation of CORAL, it is affirmed by the Honourable Mr. *Boyle*, That whilſt it grows, it is often found Soft and Succulent, and propagates its *Species*. And by *Georg. de Sepibus*, That of thoſe who had been us'd for many Years to dive for CORAL in the *Red-Sea*, *Kircher* learned thus much; *That* it would ſometimes let fall a *Spermatick* Juice, which lighting upon any [*ſteady*] body, would thereupon produce another CORAL.

RAL. And further, by *Wormius* and *Tavernier*, from the Relations of others, *That* this Juice is White or Milky. Which may ſeem the more Credible, when we conſider that the like Milky ſubſtance is found in divers Mines. Sometimes incloſed, (as is obſerved in the *Philoſ. Tranſact. Numb.* 100. by Mr. *George Planton*,) in great Hollows of the *Metallick Rock*. And that Mr. *Beamont* (*Philoſ. Tranſact. Numb.* 129. *Pag.* 730.) hath found in the Hollows of ſome Stones call'd *Entrochi*, and *Rock-Plants*, or a-kin to them, an evident *Concretion* of ſuch Milky Juice. *GREW's Muſ. Regal. Societ.*

Paracelſus makes an *Amulet* of CORAL againſt Fears, Fright, Melancholly, Epilepſie, Inchantment, and Witch-Craft.

The Learned Dr. *Brown*, in his *Vulgar Errors*, ſeems to ſuſpect, That the Cuſtome of Childrens wearing CORAL, was at firſt ſuperſtitiouſly founded; and that (poſſibly)

(poſſibly) in former times, it might be lookt upon as an *Amulet* or Defenſative againſt Witch-Craft.

Obſervations concerning BEZOAR.

THe *Deer-Goat*, is a Creature bred both in the *Eaſt* and *Weſt-Indies*: That from *Perſia* and the *Eaſt-Indies* yields the *Oriental* BEZOAR, being partly like a *Deer*, partly like a *Goat*. That of *Peru* is like the former, but without Horns, yielding the *Occidental* BEZOAR. The BEZOAR Stone is of an *Oval* Form, or round, hollow within, (the *Oriental* having Chaff, Hair, Sticks, Grains, Filth, or the like, in its Capacity, the *Occidental* Not) ſhining and ſmooth without, having a Coat folded like an *Onion*, of a various Colour, but generally of a Blackiſh Green, Pale, Aſh-Colour, or Hony-Colour, without ſcent, and much about the bigneſs of a *Walnut*.

The

The *Occidental* is rough without, Whitiſh, Aſh-Colour'd, Black, or Blackiſh-Green, and generally bigger than the former.

BEZOAR, (ſays *Tavernier*) comes from a Province of the Kingdom of *Golconda*, toward the *North-Eaſt*. It is found among the Ordure in the Paunch of a *Wild-Goat*, that browzes upon a certain Tree, the Name whereof *Tavernier* had forgot. This Shrub bears little Buds, round about which, and the Tops of the Boughs, the BEZOAR Engenders in the Maw of the *Goat*. It is ſhap'd according to the form of the Buds, or Tops of the Branches which the *Goats* eat: Which is the reaſon there are ſo many ſhapes of BEZOAR Stones.

The Natives (as *Tavernier* informs us) know by feeling the Belly of the *Goat*, how many Stones ſhe has within, and ſell the *Goat* according to the quantity. This they will find out by ſlideing their hands under

under their Bellies, and then ſhaking both ſides of the Paunch; for the Stones will fall into the middle, where they may eaſily count them all by their feeling.

The rarity of BEZOAR is in the bigneſs; though the ſmall BEZOAR has the ſame Virtue as that which is larger. But there is more deceit in the large BEZOAR; for the Natives have got a trick to add to the bigneſs of the Stone, with a certain Paſte compos'd of *Gum*, and ſomething elſe of the Colour of BEZOAR. And they are ſo cunning too, to ſhape it juſt like Natural BEZOAR. The cheat is found out two ways; the *firſt* is by weighing the BEZOAR, and then ſteeping it in warm Water: If neither the Water change Colour, nor the BEZOAR loſe any thing of its Weight, the Stone is right. The other way is to thruſt a red hot Bodkin of Iron into the Stone; if the Bodkin enters, and

cauſes

cauſes it to fry, there is a mixture. *TAVERN. Trav. in* India, *Pag.* 153, 154.

As well in the *Eaſt*, as *Weſt*, there are a great quantity of BEZOARS that breed in the ſame manner in *Cows*; of which there have been ſome that have weighed Seventeen or Eighteen Ounces; for there was ſuch a one that was given to the *Great Duke* of *Tuſcany*. But thoſe BEZOARS are little eſteem'd, Six Grains of the other BEZOAR working more powerfully than Thirty of this.

As for the BEZOAR which breeds in *Apes*, as ſome believe it, it is ſo ſtrong, that two Grains work as effectually, as Six of *Goat's*-BEZOAR: But it is very ſcarce, as being only found in thoſe *Apes*, that breed in the Iſland of *Macaſſar*. This ſort of BEZOAR is round, whereas the other is of ſeveral Fashions. And as the *Apes*-BEZOAR is ſtronger, and ſcarcer than the *Goat's*, ſo it is dearer, and

more ſought after; a piece as big as a Nut, being ſometimes worth a Hundred Crowns. The *Portugals* make great account of this BEZOAR, ſtanding always upon their Guard for fear of being Poiſon'd. *TAVERN. Ibid. Pag.* 154.

There hath always been a great Diſpute amongſt the Learned, concerning the *part* where the *Stone* grows. *Tavernier* declares, he could not find it out, though he labour'd all he could.

The *Arabians* write, That the *Goat-Deer*, and all other ſorts of *Deer*, finding themſelves Old and Sick, by their breath draw Serpents out of their Holes and devour them, that ſo thereby they become young and well again; after which, finding themſelves heated by this Food, they run into the Water, and ſtay there without drinking till their Heat be over; during which ſtay in the Water, this *Stone* is bred in the Corners of their Eyes, whence it is taken.

But

But *Monardes*, more probably, learnt from the Inhabitants of the Mountains of *China*, that in the *Indies* near the River *Ganges*, theſe *Goat-Deer*, after their eating of Serpents, go about the Tops of the Mountains, feeding on ſuch Herbs, as Nature hath taught them reſiſt *Poyſons*; of the Quinteſſence whereof, mixed with that of the *Poyſons*, the BEZOAR is by ſome particular Virtue, produc'd in ſome cavity of their Bodies; *Garſias ab Horto*, and *Acoſta* ſay, in their Stomach; *Others*, as *Fragoſus*, in the Kidneys, becauſe ſome Stones have the Figure of that *part*, which alſo is the moſt *Lapidifick* of the whole Body; and *others* too, as *Rabbi Moſes* the *Ægyptian*, in the Gall; which Opinion *Monardes* himſelf is of, though he admits too that it is found in the Ventricle, Inteſtines, and other Cavities of the Body: As, indeed, there is no place in the Bodies of Animals, but Stones may be generated in them. *PHI-*

LOS. CONFER. of the Virtuoſi *of France. Vol.* 2. *Pag.* 365.

This word [BEZOAR] ſome think is deriv'd from the Hebrew *Bel*, which ſignifies *King*, and *Zaars*, *Poyſons*, as if it were the *King* or *Maſter* of *Poyſons*, which are ſubdu'd more powerfully by this than any other Remedy. According to *Scaliger*, BEZOHARD is taken by the *Arabians* for that which preſerves *Life*, and ſo the *Stone* will have borrow'd its Name from its Effect. *Cardan* ſays, There is a Poiſonous Root of this Name, which bears a Fruit called *Nirabri*, which is an *Antidote* to it. *Plants* and every thing good againſt *Poyſons*, is commonly term'd BEZOARDICAL. *Ibidem.*

Tavernier ſays, That he once ſold a BEZOAR of four Ounces and a half, for two Thouſand *French* Livers.

He affirms, That it is Death without Mercy, to tranſport any of theſe *Goats* out of the Country.

The

The BEZOAR Stones are adulterated with Pitch, dried Blood, Stones powder'd fine, Aſhes of Shells, Antimony, Cinnabar, Mercury, mixt with ſmall BEZOAR-Stones exquiſitely pulveriz'd, and made up with a proper Mucilage.

The *Perſian* BEZOAR is beſt; then that of *Peru*; then that from *New-Spain*. The *Oriental* BEZOAR is the moſt *Sudorifick*; the *Occidental* moſt purging.

Obſervations concerning CINNAMON.

CINNAMON comes at preſent from the Iſland of *Ceylan*. The Tree that bears it is very much like the *Willow*, and has three Barks. They never take off but the firſt and ſecond, which is accounted the beſt. They never meddle with the third, for ſhould the Knife enter that, the Tree would

dye. So that it is an Art to take off the CINNAMON, which they learn from their Youth. The CINNAMON Spice is much dearer to the *Hollanders* than People think; for the King of *Ceylan*, being a ſworn Enemy to the *Hollanders*, ſends his Forces with an Intention to ſurprize them, when they gather their CINNAMON; ſo that they are forc'd to bring Seven or Eight Hundred Men together to defend as many more that are at Work. Which great Expence of theirs, very much enhances the Price of the CINNAMON. There grows upon the CINNAMON Tree a Fruit like an *Olive*, though not to be eaten. This the *Portugals* were wont to put into a Caldron of Water, together with the Tops of the Branches, and boil'd it till the Water was all conſum'd. When it was cold, the upper part became a Paſte like white Wax; of which they made *Tapers* to ſet up in their Churches,

for

for no ſooner were the *Tapers* lighted, but all the Church was Perfum'd. Formerly the *Portugals* brought CINNAMON out of other Countries, belonging to the *Raja*'s about *Cochin*. But the *Hollanders* have deſtroy'd all thoſe places, ſo that the CINNAMON is now in their hands. *TAVERN. of the* Commodities *belonging to the G.* Mogul.

CINNAMON formerly grew in ſuch great plenty in *Æthiopia*, that we find the *Southern* part of it was call'd by *Ptolomy* the Geographer, *REGIO CINNAMOMI FERA*, from the great quantity of CINNAMON which then grew there, though now there is not a Tree of it to be found in all this Countrey, as the *Portugals*, who have lookt narrowly for it, have affirm'd. *PET. HET L.*

The Ancient CINNAMON was, of all other *Plants*, while it grew, the drieſt; and thoſe Things which are known to comfort other

Plants, did make that more barren: For in Showers it proſper'd worſt: It grew alſo amongſt Buſhes of other Kinds, where commonly *Plants* do not thrive: Neither did it love the Sun: There might be one *Cauſe* of all thoſe *Effects*; namely, the *Sparing Nouriſhment*, which that *Plant* requir'd. *B A C. N A T. Hiſt.*

There is a great Diſpute concerning the difference between *Caſſia Lignea* and CINNAMON; *Some* ſay, they are both one, differing only in Names; *Others*, that they are the ſame, but differ only in place; *Others*, that they come both off of the ſame Tree, and ſo call the outward thickeſt Bark *Caſſia Lignea*, the inward thin Bark the CINNAMON: *Others* ſay, that they come off of different Trees that are very like, ſo that the *Caſſia* may be made a CINNAMON-Tree by Tranſplantation: But doubtleſs, the Shop-CINNAMON or *Canella*, is the true *Caſſia* of the *Ancients*; and if we muſt diſtinguiſh,

diſtinguiſh, you may call the thicker Bark *Caſſia*, and the thinner CINNAMON.

CINNAMON was ſo ſcarce in *Galen*'s time, that he ſays, *Lib.* 1. *De Antid.* No Man had any but the Emperour. But *Scaliger* is of the Opinion, that the CINNAMON which we now uſe, is very different from what was in *Galen*'s Days. *CÆSAR. SCALIG. Exercit.* 144.

It is a great miſtake to think (as many do) that CINNAMON will hold good for Twenty or Thirty Years, and that it impairs not with Age: For that great Father of Phyſicians, *Galen*, in the place juſt now mention'd, tells us, that by his own Experience he found the contrary.

Monſieur Thevenot ſays, that the Iſle of *Ceilan* produces the beſt CINNAMON; that the Tree (from which they have that Bark) is ſtreight, and pretty like to the *Olive*-Tree; that it bears a white Flower

Flower of an excellent Scent, and that the Fruit of it is round; that they take off the Bark in the Summer time, and that when they cut it, the ſmell is ſo ſtrong, that the Souldiers (who are to Guard the ſame) fall almoſt Sick upon't. *He* ſays, that towards *Cochin* there is wild CINNAMON; but becauſe it is weak, it is not much eſteem'd. *THEVENOT's Trav. into the* Indies, *Pag.* 109.

There are ſome who affirm, that CINNAMON when firſt gather'd hath no taſte at all, but acquires its taſte and ſtrength by fifteen Days *Sunning*. But in anſwer hereunto, Sir *Philiberto Vernatti*, late Reſident in *Java Major*, ſaith, That the CINNAMON-Tree, as it groweth, is ſo fragrant, that it may be ſmelt a great way off before it be ſeen: And that it hath even then, a moſt Excellent taſte; ſo that by *Sunning*, it loſes rather, than acquires any taſte or force. *He* alſo affirms, that the Tree being

ing pill'd, is cut down to the Root; but that the young Sprigs, after a Year or two, give the beſt and fineſt CINNAMON. *SPRAT's Hiſt. of the R. S. Pag.* 169.

In the *Philoſophical Tranſactions, Numb.* 172. *Pag.* 1031. we have an account of a ſort of *White* CINNAMON, which comes from *Guardaloupe.*

The *Ephemerides Medico-phyſicæ Germanicæ*, for the Years 1673. and 1674. make mention of CINNAMON-Trees, ſent out of *Ceylan* in Cheſts, filled with the Native Earth of that Iſland, tranſmitted into the *Low Countries*, and there thriving very well, without any conſiderable change of their Quality.

Linſchoten ſays, that the CINNAMON-Trees grow in the Iſland of *Ceylan* in great abundance, and that they ſpring up of themſelves without Planting, in the open Fields like Buſhes; that the Tree from whence the Bark is taken,

ken, they let it ſtand, and within three Years after it hath another Bark as it had before.

The CINNAMON that is not well dried, is of an Aſh-Colour; and that which is overmuch dried, is Blackiſh; but the beſt dried, is Reddiſh.

Obſervations concerning NUTMEGS.

THe NUTMEGS grow in the *Molucca* Iſlands, *Zeilan*, and the Iſle of *Banda* in the *Eaſt-Indies*.

The Tree is ſomewhat like a *Peach*: The Fruit conſiſteth of four parts; the *Firſt*, is a thick covering, like that of a *Walnut*. The *Second*, a dry and Hoſculous Coat, commonly call'd MACE. The *Third*, a harder Tegument or Shell, which lyeth under the *Mace*. The *Fourth*, a Kernel included in the Shell, which is the ſame we call NUTMEG:

MEG: All which both in their parts, and order of diſpoſure, are eaſily diſcern'd in thoſe Fruits, which are brought in Preſerves to us. *BROWN's Vulg. Errors.*

There are two ſorts of NUTMEGS, the *Male* which is long, and the *Female* round. Sir *Philiberto Vernatti*, late Reſident in *Java Major*, takes particular notice of the NUTMEG call'd *Thieving*: So call'd, becauſe that being put among a whole Room full of good NUTMEGS, though it be but one, it will corrupt them all. *PHILOSOPH. TRANSACT. Numb.* 43. *Pag.* 863.

'Tis obſervable of the NUTMEG, that the Tree which bears it, is never Planted, which, as *Tavernier* ſays, hath been confirm'd to him by ſeveral Perſons that have liv'd many Years in the Countrey. *He* ſays, the Relation they gave him, was, *that* the NUTMEG being ripe, ſeveral Birds come from the Iſlands toward the *South*, and devour

devour it whole, but are forc'd to throw it up again before it be digeſted: *That* the NUTMEG, then beſmear'd with a Viſcous matter, falling to the Ground takes Root, and produces a Tree, which would never thrive were it Planted.

This, ſays *Tavernier*, puts me in mind of making one Obſervation upon the *Birds* of *Paradiſe*. Theſe *Birds* being very greedy after NUTMEGS, come in flights to gorge themſelves with the pleaſing Spice, at the Seaſon, like *Felfares* in *Vintage* time, but the ſtrength of the NUTMEG ſo intoxicates them, that they fall dead drunk on the Ground, where the *Emmets* in a ſhort time eat off their Legs. Hence it comes, that the *Birds* of *Paradiſe* are ſaid to have no *Feet*; which, ſays *Tavernier*, is utterly falſe, for that he had ſeen three or four that had; and a *French* Merchant ſent one from *Aleppo*, as a Preſent to *Lewis* the *Thirteenth*, that

that had *Feet*; of which the King made great account, as being a very lovely Fowl. *TAVERN. Of the Commodities of the Dominions of the G. Mogul.*

Monſieur Thevenot ſays, that the beſt NUTMEGS are got in the Iſle of *Banda*, which is to the South of the *Molucca*'s: The Tree, *ſaith He*, that produces them, is no higher than our common *Apricock*-Trees that grow by themſelves; when its outward Husk falls off, its *Mace* appears of a lovely *Vermilion* Colour; but being in the leaſt expos'd to the *Air*, it changes its Colour into a light Brown, as we have it. The Tree is produc'd after this manner, There is a kind of *Birds* in the Iſland, that having pick'd off the Green Husk, ſwallow the *Nuts*, which having been ſome time in their Stomach, they void by the Ordinary way; and they fail not to take Rooting in the place where they fall, and in time to grow up to a Tree. This *Bird*

is

is ſhap'd like a *Cuckoo*, and the *Dutch* prohibite their Subjects under pain of Death to kill any of them. *THEVENOT's Trav. into the* Indies, *Pag.* 109.

'Tis to be Noted, that the Oyl of *Mace* or NUTMEGS by Expreſſion, is the Ground, Foundation, and Body of all Great, Noble, and Generous Artificial *Balſoms*: As for Example, if to Oyl of *Mace* or NUTMEGS by Expreſſion, you add a ſmall proportion of Oyl of CINNAMON, you then have *Balſam* of CINNAMON, *&c.*

The beſt NUTMEGS are thoſe which are freſh, heavy, fat, and which, when pricked, force out Oyl.

Obſervations

Obſervations concerning PEPPER.

THere are divers ſorts of PEPPER; *viz. Black*, *White*, and *Long* PEPPER. The *Black* is the commoneſt.

The Plant that beareth the *Black* PEPPER, groweth up like a *Vine* among Buſhes and Brambles, where it naturally grows; but where it is manur'd, it is Sown at the bottom of ſome Tree, where it climbs up to the top. The Leaves are few in Number, growing at each joint one, firſt on one ſide of the Stalk, then on the other, like in ſhape to the long undivided Leaves of *Ivy*, but thinner, and broader.

The Plant that bears *White* PEPPER is not to be diſtinguiſh'd from the other, but only by the Colour of the Fruit; no more than a *Vine* that beareth *Black* Grapes, from that which bringeth *White*: And by ſome it is thought, that

the ſelf ſame Plant does ſometimes change it ſelf from *Black* to *White*.

The Tree that beareth *long* PEPPER, is quite different from the Two former, and grows in another Country. It is much hotter than the common *Black* PEPPER, yet ſweeter, and of better taſte. *GERRARD's Herbal.*

Tavernier ſays, there are two ſorts of PEPPER; one is very ſmall, another ſort much bigger; both which ſorts are diſtinguiſh'd into *Small* and *Great* PEPPER. The *larger* ſort comes from the Coaſt of *Malavare*; and *Tuticorin* and *Calicut* are the Cities where it is brought up. Some of this PEPPER comes from the Territories of the King of *Viſapour*, being vended at *Rejapour*, a little City in that Kingdom. The *Hollanders* that purchaſe it of the *Malavares*, do not give Money for it, but ſeveral ſorts of Commodities in Exchange; as *Cotten*, *Opium*, *Vermilion*, and *Quick-Silver*; and this is the

the PEPPER which is brought into *Europe*.

As for the *little* PEPPER that comes from *Bantam*, *Aſchen*, and ſome other parts toward the *Eaſt*, there is none of it carried out of *Aſia*, where it is ſpent in vaſt quantities, eſpecially among the *Mahumetans*. For there are double the Grains of *Small* PEPPER in one pound, to what there are of the Great PEPPER; beſides that the *Great* PEPPER is hotter in the Mouth. *TAVERN. of the* Commodities *of the* Dominions *of the Great* Mogul.

Philippus Baldæus, in his Deſcription of ſome of the Chief Parts of the *Eaſt-Indies*, ſays, that PEPPER grows beſt in ſhady places; that it hath a weak Stem, to be ſupported like *Vines*; having on each Branch commonly ſix Cluſters, each a Foot long, in Colour like unripe *Grapes*; that they gather it, being Green, in *October* and *November*, expoſing it to the Sun to

dry, whereby it grows *Black* in a few Days.

Ligon ſays, that in the Iſland of *Barbadoes* there is a kind of *Red* PEPPER, which is of two ſorts; the *one* ſo like a Childs *Coral*, as not to be diſcern'd at the diſtance of two paces; a Crimſon and Scarlet mixt; the Fruit about two Inches long, and ſhines more than the beſt Poliſht *Coral*. The *Other* of the ſame Colour, and gliſtering as much, but ſhap't like a large Button of a Cloak; both of one and the ſame Quality; both ſo violently ſtrong, that when they break but the Skin, it ſends out ſuch a vapour into their Lungs, as makes them fall a Coughing, which laſts a quarter of an hour after the Fruit is remov'd; but, as long as they are garbling it, they never give over. The *Spaniards* are ſo much in love with this Spice, that they will have it in all their Meat, that they intend to have *piquant*, for a greater *Haut-gouſt* is not in the World.

World. *Garlick* is faint and cool to it. It grows on a little Shrub, no bigger than a *Gooſeberry* Buſh. LIGON's *Hiſt. of* Barbadoes, *Pag.* 79.

Piſo Deſcribes and Figures nine or ten ſorts of *Guiny*-PEPPER, all growing in *Braſile*, and there called *Quiya*. The *Guiny*-PEPPER is uſed as a great Stomachick Medicine, and in Sauces, both in ſubſtance and infuſion, in *America*, *Spain*, and other Countries, and by many preferr'd before the beſt PEPPER. GREW's *Muſ. Regal. Societ. Pag.* 231.

Mr. *Hughes*, in his Treatiſe, call'd *The American Phyſician*, mentions a ſort of PEPPER called the *Sweet-Scented* PEPPER, which he ſays he never ſaw but in *Jamaica*, it groweth much after the ſame manner as the *Eaſt-India* PEPPER does. *He* alſo ſays, that the *Red* PEPPER-Tree grows in many Plantations in *Jamaica*.

Obſervations concerning CLOVES.

THe CLOVE-Tree groweth in Form much like to our *Bay*-Tree, the Bark of an *Olive* Colour. The CLOVES grow Ten and Twenty together among the Leaves. The Bloſſoms at the firſt are White, then Green, and at laſt Red and hard, which are the CLOVES. The Leaf, Bark, and Wood being Green, is as ſtrong as the CLOVE. When the Bloſſoms are Green, they have the pleaſanteſt ſmell in the World. The right Colour of CLOVES, when they are dry, is a dark Yellow, and to give them a black Colour they are commonly ſmoakt. The CLOVES are gathering from *September* unto the End of *February*, not with hands, as we gather Apples, Cherries, and ſuch like Fruit, but by beating the Tree, as we do *Walnuts*. The CLOVES that ſtay on the Tree ungather'd are thick,

thick, and continue till the next Year, and theſe are called *The Mother of* CLOVES.

This Tree grows in great plenty in the *Molucca* Iſlands, as alſo in *Amboyna*, where they grow of themſelves without Planting, by the falling of the Fruit; and when they are of Eight Years growth they bear Fruit, and ſo continue bearing for an Hundred Years together.

In the place where theſe Trees ſtand, there is neither Graſs, Weed, nor any ſort of Herbs, for that the Tree draweth unto it ſelf all the moiſture round about. The CLOVES are ſo hot by Nature, that whenſoever they are made clean, and ſeparated from their Garbiſh, if there chance to ſtand either Tub, or Pail of Water, in the Chamber where they cleanſe them, or any other Veſſel with Wine, or any kind of moiſture, it will within two Days at the furtheſt be wholly dried up, although

it ſtand not near them, by reaſon of the great heat of the CLOVES that draw all moiſture to them. Of the ſame Nature is the *unſpun Silk* of *China*; ſo that whenſoever the *Silk* lieth any where in a Houſe upon the Floor, that is to ſay, upon Boards, a Foot or two above the Ground, and that the Floor is cover'd with Water, although it toucheth not the *Silk*, in the Morning all that Water will be in the *Silk*, for that it draweth all unto it. And this trick the *Indians* oftentimes uſe to make their *Silk* weigh heavy, when they ſell it, for it can neither be ſeen nor found in the *Silk*. *PURCH. Pilgr. Vol.* 2. *Pag.* 1783.

The ſame Author, *Vol.* 1. *Pag.* 699. ſays, That in *Machan*, one of the *Molucca* Iſlands, there is a CLOVE-Tree differing from all others in its Fruit, which is called *The Kings* CLOVE, much eſteem'd by the Country People, both for the variety, as alſo for the goodneſs;

goodneſs; nor is there any other but this in all the *Molucca's*; they are not to be bought for any Mony, but are given away to Friends by handfuls and half handfuls.

There is extracted from the CLOVES a certain Oyl, or rather thick Butter of a Yellow Colour, which being Chafed in the hands, ſmelleth like the CLOVES themſelves, wherewith the *Indians* Cure their Wounds, as we do with Balſam. *GERARD*'s Herbal.

Avicenna affirms, that the *Gum* of this Tree is like *Turpentine*; but he is miſtaken, it being certain, that it does not produce any at all. *MANDELSLO*'s *Trav. into the* Indies, *Pag.* 132.

Obſervations concerning GINGER.

GINGER is the Root of neither Tree nor Shrub, but of an Herbaceous Plant, reſembling the Water *Flower-De-Luce*, as *Garſias* firſt deſcrib'd; or rather the common *Reed*, as *Lobelius* ſince affirm'd.

affirm'd. Very common in many parts of *India*, growing either from *Root* or *Seed*; which in *December* and *January* they take up, and, gently dried, roſe it up in Earth; whereby ſtopping the Pores, they preſerve the Natural Moiſture, and ſo prevent Corruption. *BROWN's Vulg. Errors.*

GINGER groweth in many places of *India*, yet the beſt and moſt carried abroad, is, that which groweth on the Coaſt of *Malabar*: It grows like thin and young *Netherland Reeds*, of two or three Spans high, the Root whereof is GINGER; being Green, it is much eaten in *India* for Sallets, as alſo ſod in Vineger. The time when they are moſt gather'd, and begun to be dried, is in *December* and *January*: They dry it in this manner; They cover it with Pot-Earth, which they do to ſtop and fill up the Holes, thereby to make it continue the freſher; for the Pot-Earth preſerves it from Worms, without

without the which it is preſently conſum'd by them. GINGER is little eſteem'd in *India*, notwithſtanding there is much Shipp'd off, as well to the *Red Sea*, as to *Ormus*, *Arabia*, and *Aſia*. *PURCH. Pilgr. Vol.* 2. *Pag.* 1782.

Mr. *Ligon* ſays, that in *Barbadoes* the GINGER (being a Root) brings forth Blades, not unlike in ſhape to the Blades of Wheat, but broader and thicker, for they cover the Ground ſo, that one cnanot ſee any part of it. They are of a *Popinjay* Colour, the Bloſſom a pure *Scarlet*. When 'tis ripe, they dig up the Roots, (cutting off the Blades,) and put them into the Hands of an Overſeer, who ſets many of the Young *Negroes* to ſcrape them with little Knives, or ſmall Iron Spuds, ground to an edge. They are to ſcrape all the outward Skin off, to *kill the Spirit*; for, without that, it will perpetually grow. Thoſe that have GINGER, and not hands to dreſs it thus, are compell'd

to

to ſcald it, to *kill the Spirit*; and that GINGER is nothing ſo good as the other, for it will be as hard as Wood, and Black, whereas the ſcrapt GINGER is White and ſoft, and hath a cleaner and quicker taſte. *LIGON*'s *Hiſt. of* Barbadoes *Pag.* 79.

Dr. *Grew* in the *Muſæum Regalis Societatis, Pag.* 228. ſays, There are ſome GINGER Roots ſo large, that ſometimes one ſingle Root will weigh fourteen Ounces. *He* alſo obſerves what great variety of Opinions there is concerning this Plant. *Acoſta* compares it to that call'd *Lachryma Jobi*; *Lobelius* to a *Reed*; *Garſias* to a *Flag*; and *Bauhinus* Pictures it accordingly with a trivalvous Cod. *Piſo*, out of *Bontius*'s Papers, gives two Figures, one of the *Male*, the other of the *Female*: And ſuppoſes, that the reaſon why this Plant is ſo variouſly deſcrib'd, may proceed partly from the not diſtinguiſhing betwixt them.

Mr. *Glanius* in his Voyage to the *Eaſt-Indies*, ſays, that in the King

of

of *Bantam*'s Dominions there is a Plant call'd *Ganti*, a Root ſo like GINGER, that the *Bantamites* have given it the ſame Name, but it is dearer; and with it they rub their Bodies. *Pag.* 107.

GINGER is brought in great quantities from *Amadabat*, where (ſays *Tavernier*) there grows more, than in any other part of *Aſia*; and that it is hardly to be imagin'd, how much there is Tranſported *Candited* into Forreign Parts.

Obſervations concerning MANNA.

MANNA, or the Dew of Heaven; a delicate Food, wherewith God fed the Children of *Iſrael*, it falling from Heaven in manner of a Dew, White and ſomewhat like *Coriander* Seed; with which the *Iſraelites* lived Forty Years in the Wilderneſs, till they came to the Borders of the Land of *Canaan*. At firſt ſending hereof, the People were in ſuch admiration, that they ſaid each to other,

ther, *Manhu?* id eſt, *Quid eſt hoc?* What is this? Which ſeems to be the Cauſe why it was afterwards call'd MANNA. In *Phyſick* it is taken for a kind of Dew, or grained MANNA, which falling in hot Countries upon Trees and Herbs before break of Day, doth there congeal, almoſt like Crums of White-Bread, and is gather'd and choicely kept, as a gentle purger of Choler. *BLOUNT's* Gloſſogr.

The MANNA of *Calabria*, is the beſt, and in moſt Plenty. They gather it from the *Leaf* of the *Mulberry* Tree; but not of ſuch *Mulberry* Trees, as grow in the *Vallies*. And MANNA falleth upon the Leaves by Night, as other *Dews* do. It is very likely, that before thoſe *Dews* come upon the Trees in the *Vallies*, they diſſipate, and cannot hold out. And, in all probability, the *Mulberry* Leaf hath ſome *Coagulating* Virtue, which thickens the *Dew*, for that it is not found upon other Trees: And we ſee by

by the *Silk-Worm*, which feedeth upon that Leaf, what a dainty ſmooth *Juice* it hath; and the Leaves alſo, (eſpecially of the *Black Mulberry*,) are ſomewhat Briſtly, which (poſſibly) may help to preſerve the *Dew*. Certainly, it were not amiſs, to obſerve a little better the *Dews* that fall upon Trees, or Herbs, growing on *Mountains*: For it may be, many *Dews* fall, that ſpend before they come to the *Vallies*. And I ſuppoſe, that he that would gather the beſt *May-Dew* for *Medicine*, ſhould gather it from the *Hills*. *BACON's. Nat. Hiſt.*

The Learned and Ingenious Mr. *Evelyn*, ſays, that the MANNA of *Calabria* is found to exſude out of the Leaves and Boughs of the *Aſh*. This is alſo confirm'd by Mr. *John Ray*, in his *Hiſtoria Plantarum*, *Vol.* 2. *Pag.* 1703.

Chriſtophorus Vega Writes, that MANNA is made by a ſort of little *Bees* like thick *Gnats*, from whom, ſitting by Swarms upon Trees,

Trees, *Sweat* as it were drops from them. But *Sennertus Lib.* 4. *Cap.* 8. thinks, that they are rather drawn thither by the Sweetneſs of the MANNA, and that they make it not.

It hath been controverted among the Learned, whether the *Jews* MANNA was the ſame with *Ours*? They do indeed in many Things agree, but in this they differ, that *Theirs*, ground in a Mill, or bruis'd in a Mortar, was fit to make *Wafers*. If it be not prevented, MANNA will melt with any Sun; for even an *Eaſterly* Sun will diſſolve it.

We read in *Scaliger*, *Exercit.* 164. that thoſe Shepherds that frequent the Deſarts of *Targa*, uſe MANNA inſtead of *Sugar*, with the Water which they drink. *JOH. JOHNSTON.* Thaumatogr. *Naturalis.*

MANNA falls from Heaven like *Dew* in ſeveral of the *Oriental* Countries, as *Judæa*, *Meſopotamia*, *Perſia*,

Perſia, *Syria*, *Calabria*, and is alſo found in *England*: In thoſe hot Countries it Coagulates, with us it is liquid. The *Syrian* MANNA is beſt; then that of *Calabria*; then that which hath *Grains* like *Maſtick*: The White and Freſh is good, not old, the Red and Dark is old, and not ſo Effectual.

Obſervations concerning MASTICK.

MASTICK is a Gummy Roſin, of a Whitiſh Yellow, well ſcented, and in Grains, proceeding from the *Lentisk* Tree. The Beſt comes from *Chio*.

Three Leagues from the Iſland of *Chio*, upon a Mountain to the South, there grows a peculiar ſort of Trees; the Leaves are ſomewhat like a *Myrtle*, their Branches ſo long, that they creep upon the Ground; but which is more wonderful, that when they are down,

they riſe again of themſelves. From the beginning of *May* to the end of *June*, the Inhabitants take great care to keep the Earth under the Tree very clean; for during thoſe two Months there iſſues out a certain Gum from the Joints of the Branches, which drops upon the Ground; this is that which we call MASTICK, and the *Turks*, *Sakes*, according to the Name which they give the Iſland. The Iſland produces great ſtore of this MASTICK, which is ſpent in the *Seraglio* of *Conſtantinople*, where the Women continually chew it, to cleanſe and keep their Teeth white. When the MASTICK Seaſon draws near, the *Grand Signior* every Year, ſends a certain number of *Beſtangi's* to take care that it be not exported, but be preſerv'd for the uſe of the *Seraglio*. If it be a plentiful Year for MASTICK, the *Beſtangi's* that cull out the leſſer ſort to ſell, put it into little Bags and ſeal it up; which Bags being ſo ſealed, are never queſtion'd by the Cuſtom-

ſtom-Houſe Officers. *TAVERN.* of *Chio.*

Dioſcorides affirms, that ſeveral other Places afford MASTICK, but ſtill acknowledges, that the MASTICK that grows elſewhere, is rarer, and not ſo good as that of *Chio.* They prick theſe Trees in the Months of *Auguſt* and *September*, and the MASTICK, which is their Gum, ſweating out by the Holes they have made in the Bark, runs down the Tree, and falls upon the Ground, where it congeals into flat pieces, which ſome time after they gather, then dry them in the Sun, and afterwards range and ſhake them in a Ranging-Sive, to ſeparate the Duſt from them, which ſo ſticks to the Faces of thoſe that handle the Sive, that they cannot get it off, but by rubbing their Faces with Oyl. There are two and twenty Villages in the Iſland of *Chio* that have MASTICK-Trees, and among them all, they have about an hundred thouſand of them, for which they yearly

pay to the *Grand Signior*, three hundred Cheſts of MASTICK, which make ſeven and twenty thouſand *Oques*, at fourſcore and ten *Oques* the Cheſt, and every *Oque* contains four hundred *Drachms*. In raiſing all this MASTICK, every one of the Villages where it grows, is aſſeſs'd, at ſo many *Oques*, according as they have more or fewer Trees, for they know within a little, how much every Tree can yield; and ſeeing all Years are not alike good or bad for all the Quarters where they grow, they who gather more than they are to pay, ſell to thoſe who have not gathered ſo much as their Tax comes to, at the rate of threeſcore *Aspres* the *Oque*, for they aſſiſt one another as much as they can, elſe they would be obliged to buy of the Maſter of the *Cuſtom-Houſe*, at the rate of two *Piaſtres* the *Oque*. Afterwards, they ſell what they have over to the *Cuſtomer*, at the price of threeſcore *Aſpres* the *Oque*, which turns to good account

account to him; for they are not ſuffer'd to ſell to any but the Maſter of the *Cuſtoms*, who ſells it afterwards for an hundred and fourſcore *Aſpres*, or two *Piaſtres* the *Oque*, there being none but he in *Chio* that can ſell any, becauſe it is a Commodity that belongs to the *Grand Signior*, as the *Terra Sigillata*, or *Terra Lemnia* is; and for that reaſon they have Waiters upon all the Avenues of the Places where the Trees grow, who live in little Houſes purpoſely built for them; and ſearch all that come or go that way, to ſee if they have any MASTICK about them, and that ſo ſtrictly, that once they found a good piece about a Woman, which ſhe had hid in her moſt privy parts. Whoſoever are taken ſtealing of MASTICK, are without remiſſion ſent to the Gallies. *THEVENOT's Travels into the* Levant, *Part* 1. *Chap.* 62.

The Felling of this Tree, at the time of its *Diſtilling*, is prohibited, on

on the Penalty of loſing the Right Hand of him that does it. *PET. HEYLIN.*

In *China*, Men, Women, and Children go almoſt conſtantly with MASTICK in their Mouths, which they take to be the beſt thing in the World for faſtning of their Teeth, and alſo for a good Breath. They alſo put it into their Bread, and Biſket, to give it a more delicate Taſte. *JOH. RAII Hiſt. Plant. Tom.* 2. *Pag.* 1581.

Obſervations concerning LIGNUM ALOES.

THE LIGNUM ALOES, which in *India* is called *Calamba* and *Palo D'aguilla*, is moſt in *Malacca*, in the Iſland of *Sumatra*, *Camboia*, *Sion*, and the adjoining Countries. The Trees are like *Olive*-Trees, and ſomewhat larger; when the Wood is firſt cut down, it ſmelleth not ſo well, becauſe it is green,

for

for the drier it is, the better it ſmells: the beſt and that which ſmelleth moſt, is the innermoſt part of the Wood: Some of it is better than the reſt, which the *Indians* do preſently know how to find out. The beſt and fineſt is called *Calamba*, and the other *Palo D'aguilla*. Now to know which is the beſt, you muſt underſtand, that the Wood that is very heavy, with black and brown Veins, and which yieldeth much Oyl or Moiſtneſs (which is found by the Fire) is the beſt, and the greater and thicker it is, the better it is, and hath the more Vertue. Of this Wood they make many coſtly Things, and it has ſo curious a ſmell, that it is greatly eſteem'd; eſpecially the *Calamba*, which if it be good, is ſold by weight againſt Silver and Gold. The *Palo D'aguilla* next after the *Calamba* is much accouted of. There is another kind of *Palo D'aguilla*, which is called *Aquilla Braua*, or wild *Aquilla*, and is alſo much eſteem'd: for the *Indians* uſe therewith to burn

the Bodies of their *Bramens*, and other Men of account; and becauſe it is coſtly, therefore it is a great Honour to thoſe that are burnt therewith, as it is to thoſe that with us are bury'd in Tombs of Marble: But it is not comparable to the other *Palo D'aguilla*, nor the *Calamba*. The Wild *Aguilla* groweth moſt in the Iſland of and *Ceylon*, on the Coaſt of *Choramandel*. *LINSCHOTEN.*

Dr. *GREW* ſays, that the Honourable Mr. *BOYLE* preſented the ROYAL SOCIETY with a Piece of LIGNUM ALOES, with its own *Gum* growing upon it. *He ſays*, that the taſte of the *Gum* is perfectly like to that of the Wood: the Colour, like that of the pureſt and moſt lucid *Aloe*, called *Succotrina*: for with the Light reflected, it looks almoſt like *Pitch*; with the Light tranſmitted, it gliſters like a *Carbuncle*; powder'd, it is of a reddiſh Yellow. This, ſays the *Doctor*, or ſome other like *Aromatick Gum*, was the *Aloe* of the *Hebrews*; whence the other

other, from the Likeneſs, has its Name.

The Tree is deſcrib'd by *Linſchoten*; about the bigneſs of the *Olive*. This Wood is the Heart of the Tree, the outward part, commonly called the Sap of a Tree, being whitiſh and ſoft. 'Tis ſaid by Sir *Philiberto Vernatti*, formerly Reſident in *Java Major*, to yield a Milk ſo hurtful, that if any of it lights in the Eyes, it cauſes Blindneſs; if on any other part the of Body Scabbineſs. But, ſays Dr. *Grew*, this (doubtleſs) is to be underſtood, neither of the Heart, nor the Sap; but only of the Bark: there being no *Milk-Veſſels* in either of the former, as the *Doctor* remembers, in any Tree, by him obſerv'd. *GREW's Muſæum REGALIS SOCIETATIS*, pag. 179.

Palo D'aguilla, by Druggiſts called LIGNUM ALOES, by the *Portugals*, *Palo D'guila*, and by the *Indians*, *Calamba*, grows in *Java*, but not in ſuch Quantity, as in *Malacca*, *Sumatra*, *Cambaya*, and other places.

The

The Tree is like the *Olive*-Tree, only a little bigger. The Wood while green has no Scent, but as it dries its Odour increaſes. The weightieſt and the browneſt is the beſt; the Perfection is known by the Oyl that iſſues out of it when it is held to the Fire. They make Bands of it, and the *Indians* uſe it to embelliſh their Cabinets; but the chiefeſt uſe is for *Phyſick*; for this Wood beaten to Powder, and taken in Broth or Wine, fortifies the Stomach, ſtays Vomiting, and cures the Pluriſy, and Bloody-Flux. *GLANIUS's New Voyage to the* Eaſt-Indies, *pag.* 105, 106.

This Wood is much us'd in *India* for the making of *Beads* and *Crucifixes*. *Monfart* ſays, the *Portugals* did commonly pay a hundred Crowns a pound for it to make their *Beads*.

This Wood is brought to us in ſmall Pieces, which are heavy, bitter, and of a blackiſh Purple-colour, with Aſh colour'd Veins, of a ſweet Scent,

Scent, and if they be good, they will ſwim when put into Water.

Obſervations concerning COCHINEEL.

COCHINEEL, a kind of Duſt or Grain, wherewith to *Dye* the *Crimſon* or *Scarlet* Colour. It is a little Worm breeding in a certain Shrub, which they call *Holy-Oak*, or *Dwarf-Oak*, and is found in *Cephalonia* and other Places; on the Leaves whereof there ariſeth a *Tumor*, like a Bliſter; which they gather, and rub out of it a certain red Duſt, that converts (after a while) into *Worms*, which they kill with Wine (as is reported) when they begin to quicken. *BACUNS's Nat. Hiſt. Experim.* 887.

New Spain in *America* does ſo wonderfully abound with this Comodity, that 5670 *Arroba's* of it (each *Arroba* containg 25 Buſhels of our Engliſh Meaſure) have been ſhipp'd

ſhipp'd for *Europe* in one Year. Now, this COCHINEEL groweth on a ſmall Tree, or Shrub, having very thick Leaves, which they call a *Tuna*; planted and order'd by them as the *French* do their *Vines*; out of the Seed whereof, ariſes a ſmall *Worm* at firſt no bigger than a *Flea*, at the greateſt not much bigger than our common *Lady-Cows*, which they much reſemble; which feeding on the Leaves, and over-ſpreading all the Ground in which they are, are gather'd by the Natives twice a Year, ſtifled with Aſhes, or with Water, (but this laſt the beſt) dried to a Powder in the Shade, and ſo tranſported into *Europe*. *PET. HEYLIN.*

It is generally believ'd, that the COCHINEEL comes out of a Fruit called the *Prickle-Pear*, bearing a Leaf of a ſlimy Nature, and a Fruit Blood-red, and full of Seeds, which give a *Dye* almoſt like to *Braſiletto* Wood, that will periſh in a few days by the Fire: But the *Inſect* engendered

dered of this Fruit or Leaves, gives a permanent Tincture, as is generally known.

There grows a *Berry* (by report) both in the *Bermudas* and *New-England*, call'd the *Summer-Iſland-Redweed*, which *Berry* is as red as the *Prickle-Pear*, giving much the like Tincture; out of which *Berry* come out firſt *Worms*, which afterwards turn into *Flies* ſomewhat bigger than the COCHINEEL-Fly, feeding on the ſame *Berry*: In which we read, there hath been found a Colour no whit inferior to that of the COCHINEEL-Fly, and as to *Medecinal* Vertue much exceeding it.

Whereupon it hath been offer'd to the conſideration and tryal of the ROYAL SOCIETY. 1. Whether this *Bermuda Berry* might not grow in *England*? 2. Whether out of the *Berry* of *Braſiletto* Wood the like *Inſect* might not be obtain'd in reſpect of Colour or Tincture? 3. Whether a fading Colour, yielded by certain *Vegitables*, might not be fixed

fixed by causing such a *Fermentation* in the *Concrete*, as may engender *Insects* giving the Tincture of its *Original*, which will hold in Grain? *PHILOS. TRANSACT. Numb.* 40. *pag.* 496.

That Learned, and Ingenious Naturalist, Dr. *Lister*, is of Opinion, that COCHINEIL is a sort of *Kermes*. As you may see in a Letter of *his* to Mr. *Oldenburgh* in the *Philos. Transact. Numb.* 87.

COCHINELE. *Coccus Radicum.* The *former* Name, seemeth to be but the Diminitive of *Coccus*. The *latter*, grounded upon the Opinion, That as the *Kermes* Berry grows on the Body and Leaves, so *This*, on the Roots, of Plants, especially on those of *Pimpinel*; yet in some places only. Farther, I find no certain account. To me, thus much seems evident, That 'tis neither a *Vegetable Excrescence*, as some surmise; nor an *Insect*, as others; yet an *Animal Body*, as the *Kermes* Berry, by some *Insect* affixed to a Plant; and thence

nou-

nouriſh'd for a time, but gather'd before it be fill'd with *Mites* or *Maggots*. For being held, as the *Kermes* Berry, in the Flame of a Candle, it uſually huffs and ſwells, but always ſtinks, like Hair or Horn when they are burnt.

A Scruple of COCHINELE added to an Ounce of *Saccharum Saturni*, makes a moſt curious Purple; but I believe fading. *GREW's Muſ. Regal. Societ. pag.* 241.

In the *Philoſophical Tranſactions Numb.* 176. We have three ſeveral Figures repreſenting the COCHINEEL-Fly, as ſeen on its Belly by the help of the *Microſcope*, and by the naked Eye, and as ſeen on its back through a *Microſcope*; the Draughts of which were communicated by Dr. *Tyſon*, Fellow of the Royal Society.

Obſer-

Obſervations concerning INDIGO.

INDIGO comes from ſeveral Parts of the Great *Mogul*'s Empire; and according to the Diverſity of the Place it differs in Quality, and conſequently in price.

In the firſt place, it comes from the Territories of *Biana*, *Indoua*, and *Corſa*, a Day or two's Journey from *Agra*: Which is eſteem'd the beſt of all. It is made alſo in a Village called *Sarqueſs*, Eight Days Journey from *Surat*, and two Leagues diſtance from *Amadabat*: Here the flat INDIGO is made. There is alſo INDIGO little inferior in goodneſs and price, which comes from the King of *Golconda*'s Territories. There comes INDIGO alſo from *Bengala*, which the *Dutch* Company tranſports for *Maſlipatan*: But (as *Tavernier* informs us) the Merchants buy this INDIGO, and that of *Brampour* and *Amadabat*

madabat, cheaper by 24 in the Hundred, than that of *Agra*.

INDIGO is made of an *Herb*, which they ſow every Year after the Rains are over: Which when it is grown up, is very like our *Hemp*. They cut it three ſeveral times; the firſt cutting far exceeds the two latter. The Second cutting is worſe than the Firſt by Ten or Twelve in the Hundred. And the Third worſe than the Second by Twelve in the Hundred. The difference is found by breaking a piece of the Paſte, and obſerving the Colour. The Colour of that INDIGO which is made of the Firſt cutting, is a *Violet-Blue*, but more brisk and lively than the two others: And that which is made of the Second, is more lively than the Third.

When they have cut the *Herb*, they throw it into Pits which they make with *Lime*, which becomes ſo hard, that you would judge it to be one entire piece of *Marble*. They are generally 80 or 100 Paces

in Circuit; and being half full of Water, they fill them quite up with the *Herb*. Then they bruise and jumble it in the Water, till the Leaf (for the Stalk is worth nothing) becomes like a kind of thick Mud. This being done, they let it settle for some days; and when the settling is all at the bottom, and the Water clear above, they let out all the Water. When the Water is all drain'd out, they fill several Baskets with this Slime, and in a plain Field you shall see several Men at work, every one at his own Basket, making up little pieces of INDIGO flat at the bottom, at the top sharp like an Egg. Though at *Amadabat* they make their pieces quite flat like a small Cake. Here you are to take particular notice, that the Merchants, because they would not pay *Custom* for an Unnecessary Weight, before they transport their INDIGO out of *Asia* into *Europe*, are very careful to cause it to be sifted, to separate the Dust from

from it; which they ſell afterwards to the *Natives* of the Country to Dye their *Calicuts*. *TAVERN. of the Commodities belonging to the Dominions of the* Great Mogul.

Philippus Baldæus, in his Deſcription of ſome of the Chief Parts of the *Eaſt-Indies*, ſays, That the Plant, which yields the INDIGO, beareth a Flower like that of *Thiſtles*, and a Seed like that of *Fænum Græcum*: He ſays, That the principal Marks of good INDIGO are, dryneſs, lightneſs, and ſwimming on Water; yielding a high *Violet-Colour*; and when put upon live Coals, giving a *Violet* Smoak, and leaving but few Aſhes: *That* the INDIGO Merchant is to beware of buying moiſt INDIGO, becauſe he will then find, that in Eight Days time he loſes three Pounds in Ten; *That* the beſt way is to try it in a clear Sun-Shine, by breaking ſome Lumps in pieces, and viewing them well, whether there can be obſerv'd in them any

thing that gliſtens; which if there be, one may be ſure there is Sand in it, with which it hath been ſophiſticated, to increaſe the Weight. But for the greater aſſurance of the goodneſs of INDIGO, his Advice is, to paſs the Nail of ones Thumb over the broken pieces, and if it be good, it will be of a *Violet*-Colour, and the higher that Colour, the better the INDIGO.

Monſieur Tavernier ſays, That the penetrancy of the Powder of INDIGO is ſuch, that all the while they are ſifting it, they are fain to keep a Linnen Cloth before their Faces, and to ſtop their Noſtrils, leaving only two little holes for their Eyes: And that beſides, they are forc'd every half Hour to drink Milk, which they find to be a great Preſervative againſt the piercing Quality of the Duſt: And that notwithſtanding all this caution, they yet often find, that having been for Nine or Ten Days together employ'd about this Work, whatever

whatever they ſpit for a good while is Blueiſh. And *He* alſo tells us, That one Morning he laid an Egg among the Sitters, and when he came to break it in the Evening, it was all Blue within.

Obſervations concerning the COCO-NUT-*Tree.*

THis Tree, when Young, is very Tender; but as it becomes more lofty, ſo it grows more ſolid and ſtrong: The Body is ſtreight and ſmooth, and in Circumference equals the Waſt of a Man at the full growth: In height, Twelve or Fourteen Foot: Round about the top (and ſo a Yard or two down) Spring forth many Boughs or Branches, but without any Fork in them, beſet very thick with long and ſlender Leaves, almoſt of a *Sea-Green* Colour. At the Roots of theſe Boughs, as low as they grow round, about the

Head of the Tree, grow the CO-CO-NUTS. This *Nut* is at first, whilst it is Young, of a *Green* Colour; but when they are Ripe, they appear outwardly of a *Brown* or *Whitish Brown* Colour: They are of several sizes, some bigger, and some less: The largest of them are (Husk and Rind) two Foot in Circumference: They are almost *Oval*, and their outer Rind is very tough and thready; so fast fixed to the Shell, that it is hard to be gotten off: This Rind is nigh an Inch thick, under which is a rough strong hard Shell, some of them Black, and some Brown or Yellowish. In the top of each of these Shells there are three Holes, by which the inner Cavity receiveth a continual supply of Nourishment: Just within this Shell, sticking close thereto, is a Milk-White *Kernel*, about half an Inch thick; and the hollow Cavity within the *Kernel* is full of a thin, clear, sweet Water or Juice, which is as a Viand to them.

them. *HUGHES*'s American Phyſician.

They grow in *Jamaica*, and in moſt of the *Caribbee*-Iſlands; as alſo in the Iſlands of *Maldiva*, and other places in the *Eaſt-Indies*. But thoſe that grow in the *Eaſt-Indies* ſeem to be of another kind, growing to Forty, ſometimes Fifty Foot high.

Amongſt other rare Fruits, the Iſland *Madagaſcar* hath plenty of thoſe, which they call COCOS, or COCO-NUTS; a kind of *Date* as big as a *Cabbage*; the Liquor in it, about the quantity of a Pint, taſts like *Wine* and *Sugar*; the *Kernel* big enough to content two Men; and like good *Ale*, it affords not only Meat and Drink, but Cloathing; as alſo Furniture for their Houſes, Tackle for their Ships, Fuel for the Fire, and Timber for Building; the Body of the Tree being ſtreight and high, and towards the top diverſified into many Branches. *PET. HEYLIN.*

Linschoten says, that this Tree grows in greater abundance in the Islands of *Maldiva*, than either *Olive*-Trees in *Spain*, or *Willow*-Trees in the Low-Countreys. *He says*, They grow no where but on the Sea-side, or Banks of Rivers, and in Sandy Grounds, and that they grow not within the Land: That they have no great Root, so that a Man would think it impossible for them to have any fast hold within the Earth, and yet they stand so fast, and grow so high, that it makes one afraid to see a Man climb up to the top of them.

The Question being put to Sir *Philiberto Vernatti*, late Resident in *Java Major*, *whether there be a Tree in* Mexico, *that yields Water, Wine, Vinegar, Oyl, Milk, Honey, Wax, Thread*, and *Needles*? His Answer was, The COCO-Tree yields all this and more; The *Nut*, while it is Green, hath very good *Water* in it; the Flower being cut, drops out great Quantity of Li-

quor,

quor, called *Sury*, or *Taywack*, which drank freſh, hath the force, and almoſt the taſte of *Wine*; grown ſour, is very good *Vinegar*; and diſtill'd, makes very good *Brandy*, or *Areck*: The *Nut* grated, and mingled with Water, taſteth like *Milk*; preſſed, yields very good *Oyl*; *Bees* ſwarm in theſe Trees, as well as in others; *Thread* and *Needles* are made of the Leaves and tough Twigs. *SPRAT's Hiſt. of the ROYAL SOCIETY, Pag.* 170.

The COCO is one of the moſt uſeful Trees in the World. Of the *Husk*, or outmoſt fibrous cover of the *Nut*, all manner of Ropes and Cables are made throughout *India*. Of the *Shells*, the *Indians* make Ladles, Wine-Bottles, and many ſorts of Veſſels. The *inmoſt Cover* next the *Kernel*, while it contains only *Liquor*, they eat with Salt, as a very pleaſant Food. The ſaid *Liquor*, is commonly us'd as a clear, ſweet, and cool Drink. Sometimes they cut away the Bloſſom of the young

young *Nut*, and binding a convenient Veſſel to the place, thereby obtain a ſweet and pleaſant Liquor, which they call *Sura*. This ſtanding an hour in the Sun, becomes good *Vinegar*, uſed throughout *India*. The ſame Diſtill'd (I ſuppoſe after Fermentation) yieldeth a pretty ſtrong *Brandy*, called *Fulo*, and is the firſt running. The ſecond is called *Uraca*, the only *Wine* of *India*. Of the ſame *Sura*, being boil'd, and ſet in the Sun, they alſo make a ſort of *Brown Sugar*, which they call *Jagra*. From the *Kernel* it ſelf, when freſh, and well ſtamped, they preſs out a *Milk*, which they always mix and eat with their *Rice-Meats*. Of the *Kernel* dried (called *Copra*) and ſtamped, they make *Oyl*, both to eat and to burn. Of the *Leaves* of the Tree (called *Olas*) they make the Sails of their Ships: As alſo Covers for their Houſes and Tents; and Summer-Hats. Of the *Wood*, they make Ships without Nails; ſewing the ſeveral parts together

gether with the Cords made of the *Huſk* of the *Nut*. GREW's *Muſæum REG. SOCIET. Pag.* 199, 200.

Obſervations concerning the CACAO-*Tree, and its* NUT, *of which* CHOCOLATE *is made.*

OF theſe Trees there are ſeveral ſorts, which grow to a reaſonable height: The Bodies of the largeſt do uſually arrive in bulk (although not in tallneſs) to the largeneſs of our *Engliſh Plum*-Trees: They are in every part ſmooth; and the Boughs and Branches thereof extend themſelves on every ſide, to the proportion of a well-ſpread Tree, much reſembling our *Heart-Cherry*-Tree, but at its full growth 'tis dilated to a greater breadth in compaſs, and is ſomething loftier; there is little difference in the Leaves, theſe being pointed, but ſmoother on the Edges, and of a darker

darker Green, more like the Leaves of an *Orange*-Tree.

This Tree bears Fruit (according to Mr. *Ray*) the Second or Third Year, and every Year twice; the firſt and moſt plentiful Crop is about *June*, the ſecond about *January*: After twenty years ſtanding it begins to decay.

This Tree is ſo very tender, and does ſo particularly delight in ſhade, that, to keep it from the heat of the Sun, they are fain to Plant near it a great Tree, which ſerves only to ſhadow it, and this they call *The Mother of* CACAO.

The Fruit commonly called the CACAW-NUT, is ſhaped like a *Garden-Cucumber*, about four or five Inches long, and two broad; within the Rind there are commonly contained about twenty or thirty *Kernels*, near as big as a *Garden-Bean*, but ſmaller at one End.

This CACAW-Nut is chiefly us'd in making *Chocolate*, a Drink not only much us'd in *India*, but alſo in

in great request in most parts of *Christendom.*

These Trees grow in *America* in divers places, especially in the *Spanish* Dominions; as in *New-Spain, Mexico, Cuba, Hispaniola, &c.* They also grow in great plenty in *Jamaica.*

The Number of *Codds* the Tree produces, is uncertain: But we reckon, a bearing Tree yields from two to Eight pound of *Nuts* a Year; and each *Codd* contains from 20 to 30 *Nuts.*

The manner of *Curing* them is, to cut them down when they are Ripe, and to lay them to *Sweat* 3 or 4 days in the *Codds*; which is done, by laying them on heaps. After this they cut the *Codds*, and take out the *Nuts*, and put them into a Trough cover'd with *Plantan*-Leaves, where they *Sweat* again about Sixteen or Twenty Days. The *Nuts* that are in each *Codd*, are knit together by certain Fibres, and have about them a white

white kind of *Pulp*, that's agreeable to the Palate. By the turning and Sweating, their little Strings are broken, and the Pulp is imbibed and mingled with the ſubſtance of the *Nut*. After this, they are put to dry 3 or 4 Weeks in the Sun, and then they become of a Reddiſh dark Colour, as you ſee; and ſo are *Cured*.

What is remarkable in this Fruit, is, that the *Codds* grow only out of the Body or great Limbs, and Boughs; and that, at the ſame time, and in the ſame place, there are Bloſſoms, Young and Ripe Fruit.

This Tree requires to be ſhelter'd from the Sun while 'tis Young, and always from the North-East Winds; and to have a fat, moiſt, low Soil, which makes them to be Planted commonly by Rivers and between Mountains: So that 'tis ill living where there are good CACAO-Walks. In a Years time the Plant comes to be 4 Foot high, and hath a Leaf ſix times as big as an Old Tree,

Tree, which, as the Plant grows bigger, falls off, and leſſer come in their place, which is another extraordinary Quality of this Tree.

The Trees are commonly Planted at 12 Foot diſtance; and at 3 years old, where the Ground is good, and the Plant proſperous, it begins to bear a little, and then they cut down all or ſome of the Shade, and ſo the Fruit increaſes till the 10*th* or 12*th* Year; and then the Tree is ſuppoſed to be in its prime. How long it may continue ſo, none with us (in *Jamaica*) can gueſs; but it's certain, the Root generally ſhoots out Suckers, that ſupply the place of the old Stock when dead or cut down, unleſs when any ill Quality of the Ground or Air kill both. [*See this Accurate Account of the* CACAO-*Tree, given by a very Intelligent Perſon reſiding in* Jamaica,] which you may find in the *PHILOS. TRANSACT. Numb.* 93.

Theſe

Theſe *Kernels* being well pounded, as *Almonds*, in a Mortar, and mixed with a certain proportion of *Sugar* and *Spices* (according as the Trader thinks or finds it beſt for Sale,) are commonly made up in *Cakes* or *Rowles*; which are brought over hither from *Spain*, and other parts. But thoſe that would have a good Quantity for their own private uſe, had much better procure the NUTS themſelves, (as freſh and new as may be,) and ſo prepare and Compound them to their own Conſtitution and Taſte. And for thoſe that drink it, without any *Medicinal* reſpect, at *Coffee-Houſes*; there is no doubt but that of *Almonds* finely beaten, and mixed with a due proportion of *Sugar* and *Spices*, may be made as pleaſant a Drink, as the beſt CHAWCALATE. *GREW's Muſ. REG. SOC. Pag.* 205.

Dr. *Stubbes*, in the laſt part of his Obſervations relating to *Jamaica* (ſee the *Philoſ. Tranſact. Numb.* 37.) takes

takes notice of the Cenſure of *Simon Paula* in his *Herbal*, *Pag.* 383. againſt CHOCOLATA, and ſays, He cannot forgive him for it; being of Opinion, that that Liquor, if it were well made, and taken in a right way, is the beſt Diet for *Hypochondriacs*, and *Chronical* Diſtempers, for the Scurvy, Gout and Stone, and Women Lying-in, and Children New-Born (to prevent Convulſions; and purge the *Meconium* out,) and many other Diſtempers, that infeſt *Europe*; but that 'tis now rather uſed for *Luxury* than *Phyſick*; and ſo compounded, as to deſtroy the Stomach, and to increaſe *Hypochondriacal* Diſeaſes; and that we now ſo Cook it, as if it were to be transform'd into a Caudle or Cuſtard.

The Native *Indians* ſeldom or never uſe any Compounds; deſiring rather to preſerve their Healths, than to gratifie and pleaſe their Palats, until the *Spaniards*, coming amongſt them, made ſeveral Mix-

tures and Compounds; which inſtead of making CHOCOLATE better (as they ſuppoſed) have made it much worſe: And many of the *Engliſh* (eſpecially thoſe that know not the Nature of the CACAO) do now imitate them: For in *Jamaica*, as well as other places, when they make it into Lumps, Balls, Cakes, *&c.* they add to the CACAO-Paſte, *Chille*, or Red Pepper; *Achiote*, ſweet Pepper, commonly known by the Name of *Jamaica*-Pepper, or ſome or one of them; as alſo ſuch other Ingredients as the place affordeth, or as moſt pleaſes them that make it; or elſe as the more skillful Perſons may think it to agree with this or that Individual Perſon; adding thereto as much *Sugar* only as will ſweeten it: Firſt of all drying and beating every Ingredient apart; and then at the laſt mixing them together, as it is wrought up into a Maſs. *HUGHES*'s American Phiſician,

Joſephus

Joſephus Acoſta ſays, that in ſeveral places in the *Weſt-Indies*, The CACAW-NUT is ſo much eſteem'd, that the *Kernels* are us'd inſtead of *Money*; and commonly given to the *Poor*, as *Alms*: And that the *Indians* are wont to Treat Noble Men with CHACAWLATE, as they paſs through their Country. *JOS. ACOST. Hiſt. Lib.* 4. *Cap.* 22.

Obſervations concerning THEE, *or* TEA.

THEE is a Shrub growing in moſt parts of *China* and *Japan*; it ariſes generally to the height and bigneſs of our *Garden-Roſe* and *Currant*-Trees; the Roots are Fibrous, and ſpread into many little Filaments, near the ſurface of the Earth; the Flowers are like thoſe of *Roſa Sylveſtris*; the Seeds round, and black; which being ſow'd come to perfection in three

Years time, and then yield yearly a Crop; but theſe are little valued; the great and only Virtue of this Plant being ſuppoſed to conſiſt only in the *Leaves*; of which there are five ſorts, both as to bigneſs, and value; for the largeſt at bottom are ſold for about one Penny half Penny the Pound; but the ſmalleſt at the top for Fifty, nay ſometimes one Hundred and Fifty Crowns the Pound. *JOH. NIC. PECHLIN. De potu THEÆ.*

This Plant (ſaith the Learned *Pechlin*) abounds with a brisk volatile *Salt*, which he adjudges very agreeable to our Northern Conſtitutions, whoſe Blood is naturally very heavy, and ſluggiſh; it carries alſo with it a fine thinner ſort of *Oyl*; but ſo admirably well temper'd, that as *this* hinders the Spirit from Evaporating, ſo *that* corrects the Inflammability of *this*; from whence reſults the very agreeable bitter Aſtringent: All which together, as they rectifie the *Fer-*

ment

ment of the Blood, and at the ſame time ſtrengthen, and confirm the tone of the Parts, contribute ſo much to the aſſiſting of Nature in her Operations, as to prevent, if not to Cure, moſt *Chronical* Diſtempers.

Becauſe the diſcreet Choice of a proper *Vehicle* for this great *Panacea*, may be very material, the Learned *Author* therefore thinks good to ſhew his diſlike of *Milk*; in that it very much obſtructs its more lively and quicker parts; as always leaving behind it much acidity, which how prejudicial to *Hypochondriacal* Perſons, is ſufficiently obvious. He diſlikes the Cuſtom they uſe in *Japan*, of drinking the Leaves powder'd, ſuppoſing that it may dry the Body too much. In ſhort, He concludes *warm-Water* to be the moſt Natural and Effectual *Vehicle*, as being pure, and void of all *Saline* or other ways pernicious Particles, and being more ready to be impregnated with the Virtue

hereof; which when Armed with this powerful Vegetable, *Nature* eaſily admits into its obſcure Channels, and dark Receſſes.

He approves well enough of the uſe of *Sugar*; as it ſerves not only to qualifie the bitter taſte, by its ſweerneſs, which at the ſame time is corrected by the Heat; but as being good alſo for the Kidnies, and Lungs. He thinks the difference of Conſtitutions too great to be inſiſted on, and therefore only ſays this, *viz.* That thoſe of a dryer Habit may take it more diluted, becauſe their *Salts* may more eaſily be carried off: And for the Moiſter and Hydropical Temper, He ſuppoſes this Water, if more ſtrongly impregnated, may make way for the Evacuation of the other.

As to the Times of taking it, *He ſays*, the more empty the Stomach, the paſſage will be the more eaſy, and therefore in ſuch the more effectual: *He* condemns the uſe of it after Meals; becauſe the *Volatile* part

part flies off, before the Meat is any ways digeſted; after which the *Concoction* is difficultly perform'd; becauſe the *Ferment*, as well as the *Volatility* of the *Chyle*, is ſuppreſſed by the *Aſtringent* Quality; which in thoſe Circumſtances oft proves a thing of very pernicious Conſequence.

To conclude, our *Author*, notwithſtanding all his *Encomium*'s of this *Exotick*, can be content to think, we might receive as much benefit from ſome Plants of our own Growth; were People induſtrious to ſearch after them; ſuch as *Veronica*, *Lingua Cervina*, *Marrhubium*, *Hepatica*, *Cichoreum*, and ſome others which he names. *PECHLIN. Ibidem.*

The Phyſicians of *Tunquin* in *India* do mightily admire the Herb TEA, which comes from *China* and *Japan*; which latter Country produces the beſt. It is brought to them in Tin Pots cloſe ſtopp'd, to keep out the Air.

When they would uſe it, they boil a Quantity of Water, according to the proportion they intend to uſe, and when the Water ſeeths, they throw a ſmall Quantity into it, allowing as much as they can nip between their Thumb and Fore-Finger to a Glaſs. This they preſcribe to be drank as hot as they can endure it, as being an excellent Remedy againſt the Head-ach, for the Gravel, and for thoſe that are ſubject to the Griping of the Guts; but then they order a little Ginger to be put into the Water when it boyls. At *Goa*, *Batavia*, and in all the *Indian* Factories, there are none of the *Europeans* who do not ſpend above four or five Leaves a day; and they are careful to preſerve the boil'd Leaf for an Evening Sallad, with Sugar, Vinegar, and Oyl. That is accounted the beſt TEA, which colours the Water greeneſt; but that which makes the Water look red, is little valued. In *Japan*, the King and great Lords, who drink TEA, drink only

only the Flower, which is much more wholſome, and of a taſte much more pleaſing. But the Price is much different, for one of our ordinary Beer-Glaſſes is there worth a *French* Crown. *TAVERN. of the Kingdom of* Tunqin. *Chap.* x.

In *Japan* there is a Plant called TSIA, it is a kind of THE or TEA; but the Plant is much more delicate, and more highly eſteem'd than that of THE. Perſons of Quality keep it very carefully in Earthen Pots well ſtopp'd, that it may not take Wind: but the *Japponneſes* prepare it quite otherwiſe than is done in *Europe*. For, inſtead of infuſing it into warm Water, they beat it as ſmall as Powder, and take of it as much as will lye on the point of a Knife, and put it into a Diſh of *Porcelane* or *Earth*, full of ſeething Water, in which they ſtir it, till the Water be all green, and then drink it as hot as they can endure it. It is excellent good after a Debauch, it being certain there is not any thing

thing that allays the Vapours, and ſettles the Stomach better than this Herb does. The Pots they make uſe of about this kind of Drink are the moſt precious of any of their Houſhold-Stuff, in as much as it is known, that there have been TSIA-Pots, which had coſt between Six and Seven Thouſand Pounds *Sterling*. *MANDELSLO's Trav. into the* Indies, *pag.* 156.

The *Perſians*, *Indians*, *Chineſes*, and *Japonneſes*, aſſign to TEA ſuch extraordinary Qualities, that, imagining it alone able to keep a Man in conſtant Health, they are ſure to treat ſuch as come to viſit them, with this *Drink*, at all Hours. The Quality it is (by experience) found to have, is, that it is aſtringent, and that it conſumes ſuperfluous Humours, which incommodate the Brain, and provoke Drowſineſs. *OLEARIUS's Ambaſſadors Trav. into* Muſc. Perſ. *and* Tartar. *pag.* 241.

The *Dutch* are ſaid to tranſport the dried Leaves of *Sage* into *China*, and

and, under the Name of *European* TEA, to barter it with the *Chineſes* for their TEA.

Obſervations concerning COFFEE, *or* CAUPHE.

THis Tree is ſaid to grow only in that part of *Arabia Fœlix*, which lyeth within the *Tropicks*; and that it very much reſembles our *Cherry*-Trees, but ſcarce ſo big. It bears a *Berry* about the bigneſs of a ſmall *Bean*; of which is made a thick and bitter *Drink*, as black as Soot, and of a ſtrong Scent, but not *Aromatical*; which is commonly called COFFEE. This Drink is in ſuch mighty requeſt among the *Turks*, that, as the Learned *Veſlingius* affirms, there are no leſs than ſome Thouſands of COFFEE-Houſes in that one City of *Cairo*. It is alſo much uſed in *Barbary*, and great part of *Africk*. And of late Years it hath crept into *Europe*, nay even into

into our *Northern Climate.* So that we now see great plenty of COFFEE-Houses, not only in the City of *London*, but also in other parts of the Kingdom. And what a mighty Consumption there is of this Drink, plainly appears from that considerable Revenue, which yearly arises to the *Crown*, from the *Impost* laid upon that one Commodity of COFFE.

In the COFFEE-Houses where the *Turks* use to resort to tipple, there is usually one hired by the Owners to read either an Idle Book of Tales, which they admire as Wit, or filthy obscene Stories, with which they seem wonderfully affected and pleas'd, few of them being able to read. These are the *Schools*, which they frequent for their Information, though in Times of War, when Things went ill with them, their Discourses would be of the Ill Government; and the *Grand Signior* himself and his *chief Ministers* could not escape their Censures; which manifestly tending to Sedition, and

to

to the heightning of their Diſcontents by their mutual Complaints, and by this free venting of their Grievances, during the War at *Candia*, the wiſe *Viſier*, ſeeing the evil Conſequences that would follow, if ſuch Meetings and Diſcourſes were any longer tolerated, commanded, that all the publick COFFEE-Houſes ſhould be ſhut up in *Conſtantinople*, and ſeveral other great Cities of the *Empire*, where the *Malecontents* uſed to *rendezvous* themſelves, and find fault, upon every ill Succeſs and Miſcarriage, with the Adminiſtration of Affairs. Dr. *THO. SMITH*'s *Account of* Conſtantinople, &c. *in the PHILOS. TRANSACT. Numb.* 155.

The *Turks* look upon CAUPHE to be good all Hours of the Day, but eſpecially Morning and Even-ing, when to that purpoſe, they en-tertain themſelves two or three Hours in CAUPHE-Houſes, which throughout *Turky* abound more than Inns, and Ale-Houſes, with us. This

Drink

Drink is thought to be the old *Black Broth* used so much by the *Lacedemonians*; it dryeth ill Humours in the Stomach, comforteth the Brain, never causeth Drunkenness, or any other Surfeit, and is a harmless Entertainment of Good-Fellowship. Sir *HENR. BLOUNT's Voyage into the* Levant. *Pag.* 137.

The Lord *Bacon* in his *Natural History*, says, That this *Drink* comforteth the Brain, and Heart, and helpeth Digestion.

Monsieur *Thevenot* speaking of the Qualities of this *Drink*, says, that if it be drank *very hot*, it clears the Head of Vapours, *moderately hot* it binds up the Body, and *cold* it is Laxative. *THEV. Trav. into the* Levant. *Part* 2. *Chap.* v.

Those who write of COFFEE, do almost all reckon it amongst the *Antihypnoticks*, agreeing that it is a Driver away of Sleep.

The Learned Dr. *Willis*, in his Discourse of COFFEE, is of the Opinion, that this Drink, though most com-

commonly uſed, and very profitable in ſome Caſes, and very Medicinal; is to others perhaps very hurtful, or leſs healthful. Indeed, that it is ſo, not only Reaſon (ſays the *Doctor*) but alſo common Obſervation every where dictates, for we ſee that great COFFEE-Drinkers become lean, and are very often ſubject to be Paralytick, and grow impotent for Generation. Yet as to Affects of the *Brain*, and the *Genus Nervoſum*, I very often (ſays the *Doctor*) preſcribe this Drink for them. For indeed in very many *Cephalick* Diſeaſes and Infirmities, *viz.* in Head-aches, Giddineſs, the Lethargy, Catarrhs, and the like, where with a full habit of Body, and a cold Temperament, or one that is not hot, and a Watery Blood, there is a moiſt Brain with a Sluggiſhneſs and Dullneſs of the Animal Spirits, COFFEE has often a very good effect, for being daily drank, it wonderfully clears and enlightens each part of the Soul, and diſperſes all

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the Clouds of every Function. But on the contrary, thoſe who being thin, and of a Bilious, or Melancholick Temperament, have a ſharp, or burnt Blood, a hot Brain, and the Animal Spirits too much ſtirr'd and reſtleſs, ought to forbear this Drink altogether, as being apt to pervert both the Spirits and Humours in a greater meaſure, and to render them wholly unfit, and unable to perform any Functions: For I have obſerv'd many (ſays the Learned *Doctor*,) not having a ſufficient plenty of Spirits, and being alſo ſubject to the Head-ach, Vertigo, Palpitation of the Heart, and a trembling or numbneſs of the Limbs, who preſently after drinking COFFEE became worſe as to thoſe Affects, and ſuddenly found an unuſual Languor in their whole Body. *WILLIS Pharmaceut. Ration. Sect. 7. Cap. 3.*

COFFEE hath a cooling Quality, and the *Perſians* think it allays the *Natural Heat*. And therefore they often drink of it, on purpoſe to avoid

avoid the charge of having many Children. To this purpoſe they tell a Story of one of their *Kings*, named *Sultan Mahomet Caſwin*, who Reign'd in *Perſia* before *Tamerlane*'s time, that he was ſo accuſtom'd to the drinking of COFFEE, that, he had a ſtrange averſion to all Women; and that the *Queen* ſtanding one day at her Chamber Window, and perceiving they had got down a Horſe upon the Ground, in order to the Gelding of him, ask'd ſome that ſtood by, why they treated ſo handſome a Creature in that manner; whereupon anſwer being made her, that he was too Fiery and Mettleſome, and that the buſineſs of thoſe that were about him, was, with the taking away of the Exceſs of Mettle, which Stone-Horſes are guilty of, to deprive him of all *Generative Vertue*; the Queen reply'd, that that trouble might have been ſpar'd, ſince COFFEE would have wrought the ſame effect; and that if they would keep the Stone-Horſe

with that Drink, he would, in a ſhort time, be as tame and quiet as the *King* her Husband. *OLEARIUS in the Ambaſſadors Travels, pag.*240.

There goes a Story, (how true I know not) that the Vertue of COFFEE, was at firſt diſcover'd by a *Prior* of a *Convent*; who obſerving that the *Goats*, which fed in that part of *Arabia* where theſe Trees grow, us'd to live with little or no Sleep, and that in the day time they were mighty brisk and friſking; the ſaid *Prior* did from thence conclude, that this muſt neceſſarily proceed from the *Goats* licking up the *Berries* that fell from theſe Trees: Whereupon to ſatisfy his Curioſity, He try'd the Experiment upon another ſort of *Beaſt*, *viz.* a Sleepy Heavy-Headed *Monk*, whom the *Prior* did often ply with this ſort of *Drink*; on whom, as the Story goes, it had, in a ſhort time, ſuch a wonderful effect, that it quite alter'd his Conſtitution, and that he afterwards became more quick, brisk,

briſk, and airy, than generally that ſort of *Cattle* are.

The Goodneſs of COFFEE chiefly conſiſts in an exact way of *Parching* and managing the *Berries*; for if theſe are parch'd to a higher or lower degree than they ought, the COFFEE is ſtark naught, and good for nothing. Dr. *Berneir* affirms, that there were but two Men in the whole City of *Cairo* that rightly underſtood the Art and Myſtery of *Parching* and ordering theſe *Berries*. *JOH. RAII Hiſt. Plant. Vol.* 2. *pag.* 1692.

That Learned *Botaniſt*, Mr. *Ray*, in the place laſt quoted, tells us, that the *Arabians* are very induſtrious in deſtroying the *Vegetative* Force of the Seed, that ſo thereby they might prevent its growing in any other Countrey. Nor indeed are they to be blam'd for ſo doing; ſince from this one Commodity of COFFEE there accrues to their Country ſuch an immenſe Treaſure from almoſt all the other parts of the World; in

which reſpect, as the Learned *Ray* wittily obſerves, *Arabia* may be ſaid to be, not only *Felix*, but *Felicisſima*.

Obſervations concerning OPIUM.

OPIUM is a Tear which flows from the wounded Heads of the *Poppy* being ripe: Some do promiſcuouſly uſe it with MECONIUM, but very improperly; for OPIUM is a Drop or Tear, MECONIUM the groſs expreſſed Juice from the whole Plant; however they are both of one Quality: OPIUM is the finer Gum, and the ſtronger; MECONIUM is the courſer and weaker, yet the more malign.

OPIUM is of three ſorts. 1. Black and hard from *Syria* and *Aden*. 2. Yellower and ſofter from *Cambaia*. 3. Whiter from *Cairo* or *Thebes*; which laſt commonly called *Thebian*-OPIUM, is the beſt, being

ing heavy, thick, ſtrong ſcented like Poppy, bitter and ſharp, inflamable, almoſt of the Colour of *Aloes*, and eaſy to diſſolve in Water. The Counterfeit, when waſhed, colours the Water like *Saffron*.

The OPIUM, which is ſpent in *Europe*, comes from *Aden* or *Cairo*; but that which is ſold in the *Indies* comes out of the Province of *Gualor*, in *Indoſtan*, and is nothing but the Juice which is got out of POPPY, by an Inciſion made therein, when it begins to grow ripe. All the *Eaſtern* Nations are great Lovers of it, inſomuch that the young People, who are not permitted the uſe of it, and the meaner ſort, who are not able to buy it, will boil the POPPY it ſelf, and eat of the Broth which is made thereof. And whereas the POPPY among them is called *Puſt*, they thence call thoſe *Puſty*, who make uſe of that Broath, inſtead of OPIUM. The *Perſians* affirm, that they were the firſt who made uſe of it, and that all other Nations did it

in Imitation of their *Grandees*, who took it, at first, to provoke Sleep. They take every Day a small Pill of it, about the bigness of a Pea; not so much in order to Sleeping, as that it should work the same effect as *Wine* does, which infuses Courage and great Hopes into those, who otherwise would not discover much of either. The *Caffees*, or Messengers, who travel into the Country, take of it to hearten themselves; but the *Indians* make use of it for the most part, that they may be the better fitted for the Enjoyments of Women. No doubt but it is a Poyson, which kills, if a Man do not accustom himself thereto by little and little; and when he hath so accustomed himself, he must continue the frequent use of it, or he dies, on the other side. It so weakens their Brains who take it continually, that they run the hazard of losing the use of their Reason, and the principal Functions of their Understanding, and become in a manner stupid, if they

they recover not themſelves by the ſame Remedy. *MANDELSLO's Trav. into the* Indies, *pag.* 67.

OPIUM is commonly uſed among the *Perſians*; they make Pills of it of the bigneſs of a Pea, and take two or three of them at a time. Thoſe who are accuſtomed thereto, will take about an Ounce at a time. There are ſome who take of it only once in two or three Days, which makes them Sleepy, and a little diſturbs their Brains, ſo as that they are as if they were a little entred in Drink. There is abundance of it made in *Perſia*, eſpecially at *Iſpahan*, and it is thus ordered. The POPPY being yet green, they cleave the Head of it, out of which there comes a white Liquor, which being expos'd to the Air grows black, and their Apothecaries and Druggiſts trade very much in it. All over the *Eaſt* they uſe this Drug, the *Turks* and *Indians*, as well as the *Perſians*, inſomuch, that *Bellon* ſays, in his *Obſervations*, that if a *Turk* hath but

a *Penny*, he will ſpend a *Farthing* of it in OPIUM; that he ſaw above fifty *Camels* loaden with it, going from *Natolia* into *Turky*, *Perſia*, and the *Indies*; and that a *Janizary*, who had taken a whole Ounce of OPIUM one Day, took the next Day two, and was never the worſe for it, ſave that it wrought the ſame effect in him, as *Wine* does in ſuch as take too much of it, and that he ſtagger'd a little. It hath alſo this Quality common with *Wine*, that it does infuſe Courage into thoſe who have not much. And therefore the *Turks* never fail to take of it before they enter upon any great Deſign. The Women do not ordinarily take any; but thoſe who are not able to bear with their untoward and imperious Husbands, and prefer Death before the Slavery they live in, do ſometimes make uſe of OPIUM, whereof they take a good Quantity, and drinking cold Water upon it, they, by a gentle and inſenſible Death, depart this World. *OLEARIUS's Trav. of the Ambaſſadors*, &c. *pag.* 239.

Dr.

Dr. *Bernier*, in his Hiſtory of the late Revolution of the Empire of *Mogol*, ſays, that the *Ragipous*, or the Souldiers of that Kingdom, are great takers of OPIUM; that he has oftentimes wonder'd to ſee them take ſuch great Quantity; that they accuſtom themſelves to it from their Youth; that on the Day of Battel they double the Doſe, this Drug animating, or rather inebriating them, and making them inſenſible of Danger; inſomuch, that they caſt themſelves into the Combat like ſo many furious Beaſts, not knowing what it is to run away, but dying at the Feet of their *Commanders*, when they ſtand to it. 'Tis a pleaſure, ſays the *Dr.* thus to ſee them, with the Fume of OPIUM in their Head, to embrace one another; when the Battel is to begin, and to give their Mutual *Farewells*, as Men reſolv'd to dye. *Pag.* 60.

Tavernier ſays, that ſuch of the *Perſians*, who from their Youth have

have been great Takers of OPIUM, are ſhort liv'd: And that if they do live till Forty, they complain heavily of the Pains that proceed from the cold Venome of the Herb.

He ſays, that thoſe who have a Mind to kill themſelves, ſwallow a large piece, and drink *Vinegar* after it, to prevent the relief of any other Counter-Poyſon, and ſo they dye Smiling. *TAVERN. Trav. into* Perſia *Pag.* 242.

Sachſius in the *Ephemerides Germanicæ* An. 2. Obſerv. 69. is of Opinion, that OPIUM is an Inciter of *Venery* in thoſe who live in the *Eaſtern* parts of the World; but that it hath a quite contrary Effect on thoſe who inhabit the *Weſtern*. But herein he ſeems to be ſingular; ſince all other *Authors* do agree, that OPIUM in both, is a very great provocative to Luſt.

Johannes Jacobus Saar, in his *Itinerar. Ind. Orient. Pag.* 11. ſays, that the *Indians* make an Electuary of OPIUM,

OPIUM, which the *Chineſes* take on purpoſe to Excite them to Luſt and that by Virtue thereof, they can ly a whole Night in a conſtant Enjoyment.

Wagnerus in his *Hiſtoria Naturalis Helvetiæ*, *Pag.* 262. ſays, that in *Argovia*, where POPPY is ſow'd in great quantity, they expreſs on *Oyl* out of the *Seed*, which they uſe in their *Lamps* inſtead of *Olive-Oyl*: That ſome make uſe of it with their Meat inſtead of *Butter*, and that they alſo Knead it with their Flower, and make Cakes of it, which they eat without any manner of harm.

Obſervations concerning TOBACCO.

THE Herb call'd by the *Spaniards* TOBACCO, from an Iſland of the ſame Name in the *Weſt-Indies*, wherein it grows in great abundance, is Nam'd by the *Indians* PETUN; by others, for its

its great Virtues, *Herba Sancta*; and *John Nicot*, Embaſſador of *Francis* II. having firſt brought out of *Portugal* into *France* ſome of the Seed of it to Queen *Catherine de Medicis*, with the Deſcription of its Virtues, it became denominated from him in *French* NICOTIANE, or HERBE A' LA REINE, (the QUEENS HERB;) as in *Italy* it was term'd HERBE DE SANTA CROCE, (or HOLY CROSS) becauſe a *Cardinal* of that Name was the firſt that brought it to *Rome*. Some others call it ANTARCTICAL BUGLOSSE, HENBANE of PERU, and INDIAN WOUND-WORT. It grows, many times, to the height of three Cubits, with a ſtraight and thick Stalk, ſo fat that it ſeems anointed with Honey; it ſends forth ſundry large Branches, with many Leaves long and broad, rounder than thoſe of great *Comfrey*, ſomewhat like thoſe of great *Perſonata*, or *Bur-dock*; Fleſhy, Fat, and a little rough, of a pale Green,

Green, unpleaſing Smell, and biting Taſte; on the top of the Stalk it hath many Flowers, Oblong, Hollow, and Large, in form of a Trumpet, of a White inclining to Purple; to which ſucceed little ſlender Cods or Husks, full of a brownish Seed, ſmaller than that of *Poppy*. Its Root is thick, hath ſeveral Lobes, is Woody, yellow within, bitter, eaſily, ſeparating from its Bark and, like all Herbs hot and dry: (for this is ſo in the Second Degree,) it requires moiſt places and Shadow, and delights to be cultivated. Moreover, 'tis kept in Gardens, as well for its Beauty, as for its Faculties of curing abundance of Diſeaſes; to which 'tis the more proper, in that it hath an *Unctuoſity* or Oilyneſs familiar to our Bodies, whoſe Excrementious Humours (the Seed of moſt Diſeaſes) it potently reſolves. For as *Plants* are of a middle Nature between *Minerals* and *Animals*; ſo they are more proper and ſafe for the Preſervation

and

and reſtoring of Man's Health, than *Animals* themſelves, which by reaſon of their Similitude Act leſs on us; or than *Minerals* and inanimate Bodies, which through the too great Diverſity of their Nature Act with too much violence. *PHILOSOPH. CONFER. of the VIRTUOSI of FRANCE, Pag.* 19, 20. *Vol.* 2.

The firſt thing the *Perſians* ſet upon the Table is the Pipe, the TOBACCO, and the Diſh of Coffee; and indeed thus it is, that they begin all their Debauches. They Suck and Smoak of their TOBACCO through Water in a long Glaſs Bottel, by which means it comes cool into their Mouths; elſe they would never be able to take it all Day long as they do. They Sing very little in their Cups: But they recite a vaſt Number of Wicked Verſes, which they rehearſe with a great deal of Gravity. They are ſo accuſtomed to take TOBACCO, both Men and Women, that

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a Poor *Tradeſman* that has not above five *Sous* to ſpend, will lay out three of them in TOBACCO. If they had none, they ſay that they ſhould not have *damaque*, that is, *Gladneſs in their Hearts.* Many will confeſs, that their Exceſſive taking TOBACCO is hurtful; but if you tell 'em of it, they anſwer in a word, *Adedehoud*, *'Tis the Cuſtom. TAVERN. Trav. into* Perſia, *Lib.* 5. *Cap.* 17.

Diemerbrockius, in his Book *De Peſte*, very much commends the uſe of TOBACCO in the time of *Plague*; he ſays, it abſolutely Cur'd him when he had it; He alſo obſerves, that almoſt all thoſe Houſes, where TOBACCO was ſold, both in *Spires* (a City in the *Palatinate*,) and likewiſe in *London*, were never infected, whereas the Houſes round about them were.

The Learned Dr. *Willis*, very much commends the uſe of TOBACCO for *Souldiers* and *Mariners*; in as much as it renders them both fearleſs

fearleſs of any Dangers, and patient of Hunger, Cold, and Labour.

He ſays, that aſſoon as the Cuſtom of taking TOBACCO becomes familiar, 'tis grateful, and takes the *Animal* Spirits with ſo great a Witchcraft or pleaſing allurements, that ſome had rather be debarr'd Meat or Drink, than the uſe of it. The Reaſon of which is, that this *Smoaking* gently awaking or ſtirring up the Animal Spirits at any time, ſluggiſh or ſlothful, and as it were tickling them, provokes them into gentle and expanſive Motions, with which they are wonderfully recreated, as with the Drinking of Wine. *WILLIS.* Pharmaceut Rational. *Sect. 7. Cap.* 3.

TOBACCO grows more abundantly in the Kingdom of *Peru*, than in any other Countrey of *America*: For which cauſe, and the reſemblance it hath to *Henbane*, in Form and Quality, it is call'd the HENBANE of PERU, by *Gerrard*, and

and ſome others of our Modern *Herbaliſts*. A *Plant*, which though in ſome reſpect being moderately taken, it may be ſerviceable for *Phyſick*; yet, beſides the Conſumption of the Purſe, and impairing of our inward Parts, the immoderate, vain, and phantaſtical abuſe of this *Stinking Weed*, Corrupteth the Natural ſweetneſs of the Breath, ſtupifieth the Brain, and indeed is ſo prejudicial to the general eſteem of our Country-Men, that one ſaith of them, *Anglorum Corpora qui huic Plantæ tantopere indulgent, in Barbarorum naturam degenerâſſe videntur.* The two chief Virtues aſcrib'd unto it are, that it voideth *Rheume*, and is found to be a Soveraign *Antidote* againſt *lues Venerea*, that loathſom Diſeaſe of the *French-Pox*. As for this laſt, like enough it is, that ſo unclean a Diſeaſe may be help'd with ſuch an Unſavoury Medicine: But as for the other, it may perhaps conſiſt more in Opinion, than Truth or Reality; the *Rheume*,

which it is ſaid to void, being no more than what it breedeth at the preſent. We may as well conclude that *Bottled-Ale* is good for the breaking of Wind, (which Effect we find commonly to follow on the Drinking of it,) though indeed it be only the ſame Wind which it ſelf conveyed into the Stomach. But TOBACCO is by few now taken as *Medicinal*; it is of late times grown a *Good-Fellow*, and faln from a Phyſician to a Complement. An *Humour*, which had never ſpread ſo far amongſt us, if the ſame means of Prevention had been uſed by the *Chriſtian* Magiſtrates, as was by *Morat Baſſa* among the *Turks*: Who commanded a *Pipe* to be thruſt through the Noſe of a *Turk*, whom he found taking TOBACCO, and ſo to be carried in Deriſion all about *Conſtantinople*.

It is obſerv'd, that the taking of TOBACCO was firſt brought into *England*, by the Marriners of Sir

Sir *Francis Drake*, *Anno Dom.* 1585. *PET. HEYLIN*'s Coſmogr.

King *James* the *Firſt* (for the *Second* was no Writer,) had ſuch an averſion to this *Plant*, that he Printed a ſmall Diſcourſe againſt it, which he Entituled, A COUNTER-BLAST to TOBACCO. Wherein He very wittily obſerves, among other things, that this Cuſtom of taking TOBACCO, was at firſt deriv'd from the *Indians*, from whom he wiſh'd that we might not in time learn the other Cuſtom too. *Of Worſhipping the Devil.*

He alſo tells us, that this Cuſtom of taking TOBACCO is lookt upon, even by the *Indians* themſelves, as ſuch an Effeminate thing, that in the Market they will not offer to buy a Slave, whom they find to be a great TOBACCO taker.

The Manner of Planting and Ordering TOBACCO.

IN the Twelve-Days they begin to Sow their Seed in Beds of fine Mould, and when the Plants be grown to the breadth of a Shilling, they are fit to Replant into the Hills; for in their Plantations they make ſmall Hills about four Foot diſtant from each other, ſomewhat after the manner of our *Hop Tards*; theſe Hills being prepared againſt the Plants be grown to the forementioned bigneſs (which is about the beginning of *May*,) they then in moiſt Weather draw the Plants out of their Beds, and Replant them in the Hills, which afterwards they keep with diligent Weedings. When the Plant hath put out ſo many Leaves as the Ground will nouriſh to a ſubſtance and largeneſs that will render them Merchantable, then they take off the top of the Plant; if the Ground be

be very rich, they let a Plant put out a dozen or ſixteen Leaves before they top it; if mean, then not above nine or ten, and ſo according to the ſtrength of their Soyl, the top being taken if the Plant grows no higher; but afterwards it will put out Suckers between their Leaves, which they pluck away once a Week, till the Plant comes to perfection, which it doth in *Auguſt*. Then, in dry Weather, when there is a little Breeze of Wind, they cut down what is Ripe, letting it lye about four hours on the Ground, till ſuch time as the Leaves, that ſtood ſtrutting out, fall down to the Stalk, then they carry it on their Shoulders into their TOBACCO-Houſes, where other Servants receiving it, drive into the Stalk of each Plant a Peg, and as faſt as they are pegg'd, they hang them up by the Peggs on TOBACCO-Sticks, ſo nigh each other that they juſt touch, much after the manner they hang *Her-*

rings in *Yarmouth*; thus they let them hang five or ſix Weeks, till ſuch time as the Stem in the middle of the Leaf will ſnap in the bending of it; then, when the Air hath ſo moiſtned the Leaf, as that it may be handled without breaking, they ſtrike it down, ſtrip it off the Stalk, bind it up in Bundles, and pack it into Hogsheads for uſe.

Sometimes they are forced to Plant their Hills twice or thrice over, by reaſon of an *Earth-Worm*, which eats the Root; and when the Plant is well grown, they ſuffer damage by a *Worm* that devours the Leaf, called a *Horn Worm*, (an *Eruca* or *Caterpiller*), which is bred upon the Leaf; if theſe *Worms* be not carefully taken off, they will ſpoil the whole Crop. *THOMAS GLOVER's Account of VIRGINIA, in the PHILOS. TRANSACT. Numb.* 126.

'Tis certain, that the TOBACCO, which grows on *Salt-Peter* Ground,

Ground, flaſhes as 'tis Smoak'd; but 'tis a miſtake, that any TOBACCO grows Wild, in *Jamaica* at leaſt. The ſame *Nitrous* TOBACCO will not come to ſo good a Colour, nor keep ſo long, as other TOBACCO; inſomuch that the Merchants do oftentimes loſe all their TOBACCO in the Voyage for *England*, or *Ireland*, it rotting all by the way. *Dr. STUBBES's Obſerv. on the* Caribe-*Iſlands: In the PHILOS. TRANSACT. Numb.* 36.

If one would try a pretty Concluſion how much *Smoak* there is in a Pound of TOBACCO the *Aſhes* will tell him; for let a Pound be exactly weighed, and the Aſhes kept charily and weigh'd afterwards, what wants of a Pound weight in the *Aſhes* cannot be denied to have been *Smoak*, which Evaporated into Air: I have been told that Sir *Walter Raleigh* won a Wager of Queen *Elizabeth* upon this nicety. *JAM. HOWEL's Famil. Let. Pag.* 404. *Edit.* 5.

Obſervations concerning SUGAR, *and the* SUGAR-Cane.

THe SUGAR-Cane is a kind of Reed, both pleaſant and profitable, having long Stalks, about ſome ſix or ſeven Foot high, (if you reckon the Top-Leaves, or Branches and all,) joynted or knotted much like unto the *Great-Cane*: The Leaves come forth of every joynt on each ſide of the Stalk, long, narrow, and ſharp-pointed, much like unto ſome *Flags*, or *Flower-de-Luces*, but not ſo broad; and ſeem, at a diſtance, like thoſe Sag-Beds, which grow many together in ſome extraordinary Mooriſh or Boggy places in *England*; but of a more Blewiſh Green Colour, much like a Willow-Green. Theſe *Canes* are not hollow; but the Stalk, or Body it ſelf, is ſtuffed with a porous ſubſtance, moiſt and ſweet in taſte: From the Root Spring young *Suckers* (as they are called)

called) which are cut away, and ſerve to Plant elſewhere for increaſe. *HUGHES*'s American Phyſician.

The SUGAR-Canes grow in both the *Indies*; in the *Canary* Iſlands, *Portugal*, *Spain*, *Sicily*, *Creet*, and *Ciprus*.

The SUGAR which comes from the *Maderaes* is the beſt: That from the *Canaries* next: That from *Malta* next: Then that which comes from *Barbados*, *Virginia*, St. *Thomas*, *&c.*

The Iſland of St. *Thomas* is quite deſtitute of *Wheat*, which if ſown, turneth all to *Blade*, and brings forth no *Ear*: Nor will any Fruits here proſper, that have any *Stone* in them: But ſo abundant in SUGAR-Canes, and well ſtored with SUGARS, that forty Ships are thence loaded Yearly, with that one Commodity: For the making of which, they have there Seventy *Ingenios*, or SUGAR-Houſes, and in each of them Two Hundred Slaves, in ſome Three Hundred, which belong to the Works. Six Days

Days in Seven theſe Slaves work for their Maſters, and the Seventh for themſelves; which they ſpend in Sowing and Planting their Seeds, Fruits and Proviſions. Where, by the way, theſe SUGAR-Works, or *Ingenios*, are but a late Invention; the *Boyling* and *Baking* of SUGAR (as it is now uſed) not being above Two Hundred Years ſtanding; and the *Refining* of it, of a later Date; firſt found out by a *Venetian* in the Days of our Fathers, who is ſaid to have got above one Hundred Thouſand Crowns by this very Invention. Before which Art of *Boyling* and *Refining* SUGARS, our Anceſtors not having ſuch Luxurious Palats, ſometimes made uſe of rough SUGAR, as it came from the *Canes*; but moſt commonly pleas'd themſelves with *Honey*, more wholeſome, becauſe more Natural, than theſe forced Inventions. *PET. HEYLIN*'s Coſmogr.

Powder'd SUGAR is brought in great Quantities out of the Kingdom

dom of *Bengala*; It cauſes alſo a very great Trade at *Ougeli*, *Patna*, *Daca*, and other places. I have been told it for a very great certainty, by ſeveral Ancient People in *Bengala*, that SUGAR being kept thirty Years becomes abſolute Poyſon, and that there is no Venome more dangerous, or that ſooner works its Effects. *Loaf*-SUGAR is alſo made at *Amadabat*, where they are perfectly skill'd in *Refining* it; for which Reaſon 'tis call'd SUGAR ROYAL. The SUGAR-Loaves uſually weigh from Eight to Ten Pound. *TAVERN. Trav. in* India, *Part* 11. *Book* 11. *Chapt.* X.

That great and Eminent Phyſician, Dr. *Willis*, did ſo much diſapprove of Things preſerv'd, or very much ſeaſon'd with SUGAR, that he ſaid, he was of the Opinion, that the Invention of it, and its immoderate uſe, had very much Contributed to the vaſt increaſe of the *Scurvy* in this late Age: For

(*ſays*

(*says He*) that *Concrete* consists of a very sharp and Corrosive *Salt*, though mitigated with a *Sulphur*, as it plainly appears from its *Chymical Analysis*: For SUGAR distill'd by it self, yields a Liquor scarce inferior to *Aqua Stygia*: And if you distil it in a Vesica, with a great deal of Fountain-Water pour'd to it, though the *fixt-Salt* will not so ascend, nevertheless a Liquor will come from it, like the hottest *Aqua Vitæ*, burning and very pungent; when therefore (says the *Dr.*) SUGAR mixt almost with any sorts of Food, is taken by us in so great a plenty, how probable is it that the Blood and Humours are rendred Salt and sharp, and consequently *Scorbutical*, by its daily use? A certain Famous Author (*viz. Simon Pauli*) has laid the cause of the *English* Consumption on the immoderate use of SUGAR amongst our Country-Men: I know not (says the *Dr.*) whether the cause of the increase of the *Scurvy*, may not also

ſo be rather hence deriv'd. *WILLIS's London-Practice, Pag.* 372.

'Tis obſerv'd of Thoſe who work much in the SUGAR-Houſes, that they are very ſubject to the *Scurvy*; and that in *Portugal*, where there is a mighty Quantity of SUGAR Yearly ſpent, their chief Diſtemper is a *Conſumption*.

The manner of Ordering the CANES, *and How the* SUGAR *is made.*

WHen the CANES come to Maturity, (which the *Planters* know by ſeveral Signs, as well as we know when our Harveſt is ready,) they cut them down at or above the firſt Joynt from the Ground; (for there is little moiſture in them cloſe to the Ground) with a ſtrong Inſtrument for the ſame purpoſe, laying them even in heaps, as we uſually lay our Corn here in Harveſt-time: Then they thread off all the Branches, and bind the Stalks in Bundles, ready for their Servants to carry away; or

or else they lay them together here and there, till they can carry them away with their Horses to the *Mill*, *Machine*, or *Ingenio*, where they squeeze them: Which must be as fast as they can after they are cut; for if they lye long after they are cut before they use them, then they come by much damage; so that whilst they are cutting in the Plantations, the Mill is usually going, and the Coppers are boyling. They carry them on their Horses, being loose, or bound up in bundles, after this wise: They have a kind of *Pad* made as some of our Horses have that carry Burthens; and on each side of that are two Crooks standing up even, or higher than the Horse's back; into which Crooks the CANES, are laid on each side of the Horse; and then they carry them up to the SUGAR-Mill, which is made after this manner following.

They have an open House built on some pretty high Ground or Hill,

Hill, whereby they may have as much Air as they can, ſquare, or at leaſt pretty wide; in the middle of which they ſet up two great Poſts, of very hard and ſolid Timber, made exactly round and ſtraight, with Irons at each end fitted for them to turn, the lower end of which turneth in Braſſes faſt fixt in a great and ſolid piece of Wood: Now in one of theſe Cylinders, or Rowlers, which are to turn upright, is a ſet of Coggs ſet round about, which taketh always hold of the other Rowler, and cauſeth it to turn; ſo that both of them turn together: There being faſtned to one of the Cylinders a piece of Wood, or rather a Frame of Wood, whereunto is faſtned a Horſe or, two, to go round and draw it about, in ſuch a manner as moſt Brewers in *England* Grind their *Mault*.

Now the *Mill* being prepared, and the CANES laid by it, and all things ready to ſet them to work; there is one that doth always put the

the CANES between these *Rowlers*, as they turn, which draw them through, by turning very nigh one against another; so that it squeezes all the Juice or Moisture out of them: And then there is another always to take the Crusht CANES away; unless one sometimes make shift to do both, which commonly is too hard a Task.

Now under these Rowlers is set a Receiver, as a Trough, Cistern, or the like convenient thing, to receive the Juice or Liquor that is squeez'd out of the CANES: And from this Trough or Cistern, is a Spout to convey this Juice into the Furnaces or Coppers, where it is to be boyl'd to SUGAR; whereas, in some SUGAR-Houses, there are five or six Coppers for that purpose, which are commonly set in a House built only for the same use, at a distance from the Mill; and also somewhat lower than the Mill, because the Liquor is always running down into the Coppers: All which Pas-

sage

ſages and Veſſels muſt be kept very clean; for otherwiſe, they are by reaſon of the great heat apt to Sower, and ſo ſpoil the Juice: Neither muſt the Juice be long kept after it is preſſed out; for if it once grow Sower, it is not then fit to make SUGAR.

Theſe Coppers are ſet all one by another a-thwart the end of the SUGAR-Houſe, or *Curing*-Houſe, (as they term it,) ſo that the upper edges of each Copper do almoſt touch one another, being faſt fixed in Brick-work, and cemented round the Edges, that no Fire can get up, or be ſeen in the SUGAR-Houſe: But the mouth of the Furnaces where the Fire is put, is ſo contriv'd, that they are made and appear on the outſide the Houſe; where before them is always ready cut great ſtore of Wood to caſt in, to maintain the Fire ſo long as they boil.

Now, if there be ſix Coppers, the firſt two are thinneſt and biggeſt, in which the Juice is firſt boil'd; but

not by a very ſtrong Fire, for that will make the *Scum* to riſe, by caſting in *Temper*, as they call it: the firſt of which that ariſeth is little worth; but afterwards, what is ſcumm'd off, they make a very good drink of, called *Locus-Ale*, much uſed by the Servants in *Jamaica*; or elſe they convey it into a *Copper-Still* (as they do all their other Setlings and Dregs of SUGAR) to be diſtill'd, and make a ſort of *ſtrong-Water*, which they call *Rum*, or *Rumbullion*, ſtronger than *Spirit of Wine*, and not very pleaſant, until a Man be us'd to it. This ſtrong Liquor is ordinarily drank amongſt the Planters, as well alone, as made into *Punch*.

Furthermore, when this Juice hath ſo boil'd into the two firſt Coppers, then is it ſtrained into the third and fourth Furnaces, which are leſs and thicker, and there it is boil'd by ſomewhat a greater Fire; and as it begins to grow pretty thick, then is it put into the fifth and ſixth Coppers

pers, and there boil'd by a greater and very ſtrong Fire, to a juſt conſiſtence: Theſe Coppers are leſſer and thicker than the other, which the Maſter-Workman doth always tend, with a great deal of care, till it be boil'd enough; and then they put it into Wooden-Boxes, made broad at the top, and narrow at the bottom, with a hole almoſt like a *Mill-Hopper*: then they ſet it in the *Curing*-Houſe, in which there is a place made to ſet them all in Rows; under the bottom of which Gutters or Troughs are placed to receive the *Mallaſſus*, and convey it into a Veſſel. They cover the tops of theſe Boxes, or Earthen Veſſels, with a temper'd white Earth: and indeed there is great Art in *whitening* and making of good SUGAR. See *HUGHES*'s *American Phyſician*, pag. 30, 31, 32, 33, & 34.

The principal Knack, without which all their Labour were in vain, is in making the *Juice*, when ſufficiently boil'd, to *Kerne* or *Granu-*

late. Which is done, by adding to it, a ſmall proportion of *Lye* made with (*Vegetable*) *Aſhes:* without which, it would never come to any thing by boiling, but a *Syrup*, or an *Extract*. But a little of that *Fixed Salt*, ſerves, it ſeems, to *Shackle* or *Chryſtallize* (which is a degree of *Fixation*) a very great quantity of the *Eſſential Salt* of this *Plant*.

In refining the SUGAR, the firſt degree of *pureneſs* is effected, only by permitting the *Moloſſes* to drain away through a Hole at the bottom of the SUGAR-*Pots*; the *Pots* being, all the time, open at the top. The Second Degree is procur'd, by covering the *Pots* at the top with *Clay*. The reaſon whereof is, for that the *Air* is hereby kept out from the SUGAR, which, in the open *Pots*, it hardens, before it hath full time to refine by Separation. And therefore, whereas the firſt way requires but one Month, this requires four. The fineſt SUGAR of all, is made with *Lime-Water* (and

(and ſometimes *Urine*) and *Whites* of *Eggs*.

That which *Dioſcorides* calls σάκχαρον; *Galen*, *Sacchar*; and *Archigenes*, *Sal Indium*; is the ſame thing for ſubſtance, ſaith *Matthiolus*, with that we call SUGAR: ſaving that, whereas this is made of the Juice expreſſed and boil'd; that of the *Ancients*, as is likely, was only the *Tears*; which burſting out of the CANE, as the *Gums* or *Milks* of *Plants* are uſed to do, were thereupon harden'd into a pure *White* SUGAR. That the SUGAR of the *Ancients* was the ſimple concreted Juice of a CANE, he well conjectures: But that it was the Juice or *Tears* of the SUGAR-CANE, he proves not. Nor, I think, could be, if, as is ſuppoſed, it was, like *Salt*, friable and hard. And in affirming *our* SUGAR to be the ſame for Subſtance with that of the *Ancients*, he much miſtakes; *that* being the ſimple Juice of the CANE, *this* a compounded Thing, always

mixed either with the *Salt of Lime*, or of *Aſhes*; ſometimes of *Animals* too. *GREW's Muſ. Reg. Societ.* pag. 224, 225.

In *Jamaica* the SUGAR *cures* faſter in ten days, than in ſix Months in *Barbadoes*: and this happens in ſuch places, as it rains for many Months at the ſame time; but you muſt know, that *Rains* there are ſudden, and make no previous Alteration in the Air before they fall, nor do they leave it moiſt afterwards. Dr. *STUBBES* in the *PHILOS. TRANSACT.* Numb. 36. pag. 705.

Obſervations concerning DIAMONDS.

THE principal DIAMOND Mines now known, are four. That of *Raolconda*, in the Kingdom of *Viſapour*; diſcover'd two hundred Years ſince. In this Mine, the DIAMONDS lie in ſandy Veins in the Rocks.

Rocks. Of all, the *cleareſt*, and of the whiteſt *Water*. They pound and waſh the Vein for the DIAMONDS, juſt as we do ſome of our *Ores* for the *Metal*. A ſecond call'd the *Gany*, about ſeven Days Journey from *Golconda*; found out a hundred Years ſince. They dig here not above fourteen foot deep. Sometimes above ſixty thouſand Men, Women, and Children are at work. It affords the largeſt DIAMONDS, but not clear. A Third, that of *Govel*, a River in the Kingdom of *Bengala*. The DIAMONDS are found in the Sand of the River, for the ſpace of fifty Leagues. From hence come thoſe fair pointed Stones, called *Natural Points*: but not great. The Fourth, that of *Succadan*, a River in *Borneo*. But there are none come from thence but by ſtealth. *GREW's Muſ. Reg. Societ.* pag. 281, 282.

There are in the DIAMOND-Rocks of *Raolconda* ſeveral *Veins*, ſome half a finger, ſome a whole

finger-wide: And the *Miners* make make uſe of Irons with Hooks at the end, with which they pick out the Earth or Sand, which they put into Tubs, and among that Earth, they find the DIAMONDS. But becauſe theſe *Veins* do not run always ſtreight, but ſometimes down, ſometimes upward, the *Miners* (following always the trace of the *Veins*) are often conſtrain'd to break the Rock with great Iron-Leavers, and ſtriking with a violent force; which often flaws the DIAMOND, and makes it look like *Chryſtal*. Which is the reaſon there are found ſo many ſoft Stones in this DIAMOND-Mine, though they make a great ſhew. When they have open'd all the *Veins*, and taken out all the Sand, then they waſh it two or three times over to look for the DIAMONDS. *TAVERN. Trav. in* India, Part II. Book II. Chap. xi.

The Water of thoſe DIAMONDS which are drawn, not from the Rock, but the Ground, commonly partakes of

of the Colour of the Soil wherein they are found. So that if the Earth be clean and ſomewhat ſandy, the DIAMONDS will be of a good Water; but if it be fat or black, or of any other Colour, they will have ſome tincture of it. *BOYLE of Gems*, pag. 51.

Whereas it is commonly ſaid, that as *Gold* is the heavieſt of *Metals*, ſo *Diamonds* are the hardeſt and heavieſt of *Stones*. The Honourable Mr. *Boyle* can by no means agree to this Aſſertion, ſince as he tells us, in his Diſcourſe of *GEMS*, *pag.* 52. He by his own Experience knows it to be falſe.

Boëthius, in his Treatiſe *De Gemmis & Lapidibus*, affirms, that DIAMONDS receive no hurt, but are rather mended, by the Fire.

Garcias lib. 1. *cap.* 43. tells us, that ſome DIAMONDS, being rubb'd, will take up Straws, juſt like *Amber*, and other *Electrical* Bodies. And Mr. *Boyle*, in his foremention'd *Tract* of *GEMS*, *pag.* 109. men-

mentions a DIAMOND of his, which with a little friction attracts vigorouſly. And that he had another DIAMOND in his keeping, which by Water, made a little more than luke-warm, He could bring to ſhine in the Dark. *Ibidem, pag.* 112.

'Tis the property of all true DIAMONDS, to unite the *Foyle* cloſely and equally to it ſelf, and thereby better augment its Luſtre, than any other *Gem.* That which is called the *Foyle*, is a mixture of *Maſtick* and burnt *Ivory:* The latter, being one of the blackeſt of Colours; uſed by *Painters* for *Velvet*, the *Pupil* of the *Eye*, &c. *GREWS's Muſ. Reg. Societ.* pag. 282.

Between the *Grain* and the *Vein* of a DIAMOND, there is this difference, that the former furthers; the latter, being ſo inſuperably hard, hinders the ſplitting of it. Altho it ſeems, that a *Vein*, ſometimes is nothing elſe, but a *Croſs-Grain.* Our *European* Jewellers, when they ſplit one, they take a very ſmall Iron Wyre,

Wyre, and having daubed it with Oil and Powder of DIAMONDS; draw it upon the DIAMOND, by a Tool, to and fro like a *Saw*, ſo long as is needful for that purpoſe. *GREW ibidem.*

As for the Water of DIAMONDS, it is remarkable, that whereas in *Europe* we make uſe of Day-light to examine the rough Stones, and to judge of their Water, and the Specks that are found therein; the *Indians* do all that in the Night-time, ſetting up a Lamp with a large Wick, in a hole which they make in the Wall, about a Foot ſquare; by the Light whereof they judge of the Water and clearneſs of the Stone, which they hold between their Fingers. The Water which they call *Celeſtial* is the worſt of all, and it is impoſſible to diſcern it ſo long as the Stone is rough. The moſt infallible way to find out that Water, is to carry the Stone under a Tree thick of Boughs, for by the verdure of that ſhade you may eaſily diſcern whe-

whether the Water be blewiſh or no. *TAVERN. TRAV. in* India, Part II. Book II. Chap. xii.

To know the value of DIAMONDS, if they be every way perfect, *Tavernier* gives this Rule: That if a good DIAMOND weigh one *Carat*, *viz.* four Grains, 'tis worth 150 *French Livres*; and then to know, how much a good Stone, weighing 12 *Carats*, is worth, you are to multiply 12 by 12, which makes 144; which Product is to be multiplyed by 150 (the price of a Stone of one *Carat*,) which will make 21600 Livres, the price of a DIAMOND of 12 *Carats*. But if the DIAMOND be not perfect, then you are to allow but 80 Livers for a *Carat*; and if ſuch a kind of DIAMOND ſhould weigh 15 *Carats*, then multiply 15 by 15, which is 225, and this into 80, makes 18000 Livres, the value of that DIAMOND.

According to which Rule, the DIAMOND of the Great *Mogol* (weigh-

(weighing 279 and 9 16*th Carats*, being of a perfect good Water, and of a good ſhape, with only a little flaw in the edg of the cutting below, which goes round about the Stone) will amount to 11723278 Livres. Were it not for that little flaw which is mention'd, the firſt *Carat* of this DIAMOND were worth 160 Livres, but *Tavernier* allowing for that flaw, he values the firſt *Carat* but at 150 Livres, and ſo he has made his Computation.

He ſays, that the Great Duke of *Tuſcany*'s DIAMOND weighs 139 *Carats*, clean and well-ſhap'd, cut in *Facets* every way: but that in regard the Water inclines ſomewhat toward the Colour of *Citron*, He does not value the firſt *Carat* above 135 Livres; ſo that by the Rule the DIAMOND ought to be worth 2608335 Livres. *TAVERN. ibid.* Chap. 15.

Obſer-

Obſervations concerning PEARL.

IN the firſt place, there is a Fiſhery for PEARLS in the *Perſian* Gulf, round about the Iſland of *Bakren*. Every one that fiſhes pays to the King of *Perſia* five *Abaſſi's*, (every *Abaſſi* is worth about 18 *Sols* French Money) whether he get any thing or no. The Merchant alſo pays the King ſome ſmall matter for every thouſand *Oyſters*.

The ſecond Fiſhery for PEARLS is right againſt *Bakren* upon the Coaſt of *Arabia Felix*, near the City of *Catifa*, which together with all the Country about it, is under the Juriſdiction of an *Arabian* Prince. The PEARLS that are fiſh'd in theſe Places are ſold to the *Indians*, who (as *Tavernier* informs us) are not ſo nice as we; for they give a good price for all, as well the *uneven* as the *round* ones.

There is another Fiſhery for PEARLS in the Sea that beats againſt

gainſt the Walls of a great Town call'd *Manar*, in the Iſland of *Ceylan*. For their *roundneſs* and their *Water*, they are the faireſt that are found in any other Fiſhery; but they rarely weigh above three or four *Carats*.

There are excellent PEARLS, and of a very good Water, and large, which are found upon the Coaſt of *Japan*; but there are few fiſh'd for, in regard *Jewels* are of no eſteem among the Natives.

There are other Fiſheries, in the *Weſt-Indies*; in the firſt place all along the Iſland of *Cubagna*, three Leagues in compaſs, lying ten Degrees and a half of Northern Latitude, a hundred and ſixty Leagues from *Santo Domingo*. The PEARLS are ſmall, ſeldom weighing above five *Carats*.

The ſecond Fiſhery is in the Iſland of *Margarita*, or the Iſland of PEARLS, a League from *Cubagna*, but much bigger. This Fiſhery is not the moſt plentiful, but it is the moſt

moſt eſteem'd of all thoſe in the *Weſt-Indies*, by reaſon the PEARLS are of a moſt excellent Water, and very large. *Tavernier* ſays, He ſold one *Pear*-faſhion'd to *Sha-eſt-Kan*, the Great *Mogul*'s Uncle, that weighed fifty five *Carats*.

The third Fiſhery is at *Camogete*, near the Continent.

The fourth at *Rio de la Hacha*, all along the ſame Coaſt.

The fifth and laſt, at St. *Martha*'s, ſixty Leagues from *Rio de la Hacha*. All theſe three Fiſheries produce very weighty PEARLS; but they are generally ill ſhap'd, and of a Water enclining to the Colour of Lead.

As for *Scotch* PEARL, and thoſe that are found in the Rivers of *Bavaria*, though a *Neck-lace* of them may be worth a thouſand Crowns, yet they are not to be compar'd with the *Eaſtern* and *Weſt-Indian* PEARLS.

Some Years ſince, there was a Fiſhery diſcover'd in a certain place upon the Coaſt of *Japan*; *Tavernier* ſays,

ſays, *He* has ſeen ſome which the *Hollanders* have brought thence; They are of a very good Water, and large, but very uneven. *TAVERN. Trav. in* India, Part II. Book II. Chap. xvii.

Over all *Aſia* they chuſe the yellow Water inclining to white; for they ſay, thoſe PEARLS that incline ſomewhat to a Gold Colour, are more brisk, and never change Colour; but that the white ones will change in Thirty Years time, through the very heat of the Weather, and the Sweat of the Perſon that wears them, turning them ſcandalouſly yellow.

Take this Obſervation along with you, touching the difference of their Waters; ſome being very White, others inclining to Yellow, others to Black, others to a Leaden Colour. As for the laſt, there are no ſuch, but only in *America*, which proceeds from the Nature of the Earth, at the bottom of the Water, which is generally more Ouzy than

in the *Eaſt*. I once met with Six PEARLS, in the return of a Cargo from the *Weſt-Indies*, that were perfectly round, but black like *Jet*, which weigh'd one with another Twelve *Carats*. I carried them into the *Eaſt-Indies* to put them off, but could meet with no Chapman to buy them. As for thoſe that incline to Yellow, it proceeds from hence, that the Fiſhermen ſelling the Oyſters to the Merchants in heaps, while they ſtay Fourteen or Fifteen Days, till the Oyſters loſe their Water, the Oyſters waſt and begin to ſmell, for which reaſon the PEARL grows Yellow by Infection; which appears to be a Truth, in regard that where the Oyſters preſerve their Liquor, the PEARLS are White. Now the Reaſon why they ſtay till the Oyſters open of themſelves, is, becauſe that if they ſhould force them open, they might perhaps injure and cut the PEARL. In ſhort, the *Eaſtern* People are much of our Humour, in matter of

of *Whiteneſs*, for they love the whiteſt PEARLS and the blackeſt *Diamonds*; the whiteſt Bread, and the faireſt Women. *TAVERN. Ibid.*

Some Ancient Writers have commonly Reported, that PEARLS are produc'd by the Dew of Heaven, and that there is but one in an Oyſter; but Experience teaches the contrary. For the Oyſter never ſtirs from the bottom of the *Sea*, where the Dew can never come, which is many times Twelve Fathoms deep; beſides, that it is as often obſerv'd, that there are Six or Seven PEARLS in one Oyſter; and I have had in my hands an Oyſter, wherein there were above Ten beginning to breed. 'Tis very true, that they are not always of the ſame bigneſs; for they grow in an Oyſter after the ſame manner as *Eggs* in the Belly of a Pullet. But I cannot ſay there are PEARLS in all, for you may open many Oy-

ſters and find none. *TAVERN. Ibid. Chapt.* XVIII.

They Fiſh in the *Eaſtern* Seas twice a Year; the Firſt time in *March* and *April*, the Second time in *Auguſt* and *September*; and they keep their Fairs in *June* and *November*. However they do not Fiſh every Year; For they that Fiſh, will know beforehand whether it will turn to account or no. Now to the end they may not be deceiv'd, they ſend to the places where they are wont to Fiſh, ſeven or eight Barks, who bring back each of them about a Thouſand Oyſters, which they open, and if they find not in every Thouſand Oyſters to the value of Five *Fano's* of PEARLS, which amounts to half a Crown *French* Money, 'tis a ſign that the Fiſhing will not turn to account, in regard the poor People would not be able to defray their Charge. For partly for a Stock to ſet out, and partly for Victuals while they are abroad, they are forc'd to borrow

row Money at three or four in the Hundred a Month. So that unleſs a Thouſand Oyſters yield them five *Fano*'s of PEARLS, they do not Fiſh that Year. As for the Merchants, they muſt buy their Oyſters at hap-hazard, and be content with what they find in them. If they meet with great PEARLS, they account themſelves happy; which they ſeldom do at the Fiſhery of *Manar*, thoſe *Pearls* being fit for little elſe but to be ſold by the Ounce, to Powder. Sometimes a Thouſand Oyſters amounts to ſeven *Fano*'s, and the whole Fiſhery to a Hundred Thouſand *Piaſters*, (every *Piaſter* being worth four Shillings *Sterling*.) The *Hollanders* take of every *Diver* 8 *Piaſters*, in regard they always attend the Fiſhery with two or three ſmall Men of War, to defend them from the *Malavares* Pyrats.

The more Rain falls in the Year, the more profitable the Fiſhery happens to be. They Fiſh in Twelve

Fathom Water, Five or Six Leagues off at Sea, ſometimes Two Hundred and Fifty Barks together, among which there is not above one or two *Divers* at moſt. *Ibidem:*

Monſieur Thevenot ſays, that the Two Fiſheries, at *Manar* and *Tutucorim*, (which is over againſt the Iſle of *Manar*,) have ſometimes been ſpoilt, by throwing into the bottom of the *Sea* a certain *Drug* that chas'd away the Fiſh that breed them, and hinder'd them for many Years from coming back again; and that they who did it (knowing whither they went) fiſh'd them there, and grew rich, before it was known that there was good Fiſhing in that Place. *THEV. Trav. into the* Indies, Pag. 109.

There goes a Common Tradition, that PEARL, which hath loſt its Colour, may be recover'd by *being buried in the Earth*; which if true, would (as the *Lord Bacon* Obſerves) be a thing of great advantage:

vantage: But that *Noble Lord* tells us, that, upon a Six Weeks Trial, he could find no ſuch Effect. But for a further Satisfaction, he ſays, it were good to try it in a *Deep Well*; or in a *Conſervatory* of *Snow*, where the Cold may be more Conſtringent; and ſo make the *Body* more United, and thereby more Reſplendent. *BAC. Nat. Hiſt. Experim.* 380.

Of the Way and Manner of DIVING *for* PEARL.

THere is a Cord ty'd under the Arms of them that DIVE, one end whereof is held by them that are in the Bark. There is alſo a great Stone of 18 or 20 Pound ty'd to the great Toe of him that DIVES; the end of the Rope that faſtens it, being alſo held by them in the Veſſel. The DIVER has beſide a Sack made like a Net, the Mouth whereof is kept open with

a Hoop. Thus provided, he plunges into the Sea, the Weight of the Stone preſently ſinking him: When he is at the bottom, he ſlips off the Stone, and the *Bark* puts off.

Then the DIVER goes to filling his Sack, as long as he can keep his breath; which when he can do no longer, he gives the Rope a twitch, and is preſently hal'd up again. After the DIVER is drawn up, he ſtays half a quarter of an hour to take breath, and then *dives* again (at this rate) for ten or twelve hours together.

Thoſe of *Manar*, are better Fiſhers, and ſtay longer in the Water than thoſe of *Bakren* and *Catifa*; for they neither put Pincers upon their Noſes, nor Cotton in their Ears, as they do in the *Perſian* Gulf.

The PEARL-DIVERS are fed with dry and roaſted Meat, on purpoſe to enable them to hold their Breath the longer.

Sir

Sir *Philiberto Vernatti*, late Preſident in *Java Major*, ſays, that the longeſt the PEARL-DIVERS in thoſe Parts can continue under Water, is about a quarter of an hour; and this they can do by no other means but Cuſtome: For PEARL-DIVING (as he obſerves) laſteth not above ſix Weeks, and the DIVERS ſtay a great while longer under Water at the end of the Seaſon, than at the beginning. *PHILOSOPH. TRANSACT. Numb.* 43. *Pag.* 863.

The ſame Perſon alſo affirms, that the PEARL Fiſhing is accounted ſo very dangerous, that the DIVERS do commonly make their Will, and take leave of their Friends, before they tread the Stone to go down. *SPRAT's Hiſt. of the ROYAL-SOCIETY, Pag.* 169.

The PEARL-Oyſters are ſo very hard and tough, and of ſuch an Unpleaſant Taſt, that they alway's throw them away.

To

To Conclude the Diſcourſe of PEARLS, you are to take notice, that in *Europe* they ſell them by the *Carat* Weight, which is four *Grains*. In *Perſia* they ſell them by the *Abas*, and one *Abas* is an Eighteenth leſs than our *Carat*. In the Dominions of the *Mogul*, the Kings of *Viſapour* and *Golconda* Weigh them by the *Ratis*, and one *Ratis* is alſo an Eighteenth leſs than our *Carat*.

Obſervations concerning ſeveral PRECIOUS STONES.

THE AGATE, is ſo called from the River ACHATES in *Sicily*, near which it was firſt found. Almoſt of the Colour of *Clear-Horn*. The hardeſt of *Semi-perſpicuous Gems*. They grow in *India*, *Germany*, and *Bohemia*.

Naturally Adorn'd with much Variety of waved and other figur'd Veins, Spots, the repreſentation of *Vegetable*,

Vegetable, and ſometimes of *Animal* Bodies. None more memorable, than that mention'd by *Pliny* of *Pyrrhus* King of *Epyrus*, in which, without much ſtrain of Phancy, one might imagine a Repreſentation of the *Nine Muſes*, and *Apollo*, with his *Harp*, in the middle of them.

'Tis uſed for *Sword-Hilts*, *Knife-Haſts*, *Beads*, *Cups*, and the like. There are pieces of it, ſometimes as thick as a Man's Arm. *GREW's Muſ. Reg. Societ. Pag.* 287. 288.

The AMETHYST, hath its Name from the Opinion of its being an *Amulet* againſt Drunkenneſs, and ſo much the Word (in *Greek*) imports. The Beſt are thoſe of a Purple Colour, Shining and Sparkling. It is brought from *India*, *Arabia*, *Armenia*, and *Egypt*.

The AMETHYST, is often called *GEMMA VENERIS*, from its Beauty and Splendor. *Pliny* obſerves, that the *Indian* AMETHYSTS have the exact Colour of the *Phœnician* Purple; which (*ſays he*)

be) the *Diers* would be glad if they could but imitate.

CRYSTAL, deriv'd from κρύος and στέλλω: Becauſe ſuppos'd to be only Water contracted or condenſed with Cold.

It is a Stone found in *India*, *Scythia*, *Spain*, *Germany*, and *Aſia*; more tranſparent than clear Glaſs. It is the ſofteſt of all *Gems*; that which is moſt pure and tranſparent is beſt.

CRYSTAL, at leaſt ſome ſorts of it, is the ſofteſt, ſaith *Bætius*, of all *Gems*. He ſhould have ſaid, of all perſpicuous *Gems*: For the *Turcois* is much ſofter. The moſt uſual Figure of CRYSTAL, is *Sexangular*: Yet *Terzagi* mentions a Rock of ſquare pointed ones. But it is obſervable, ſays *Dr. Grew*, that he ſaith the Bed on which they grew, ſeem'd to be *Gold-Ore*. If ſo, it might proceed from ſome Governing Principle in the *Ore*. For I have heard it Noted, ſaith the *Dr*, as I Remember, by Sir *Chriſtopher Wren*,

Wren, That *Grain-Gold* is often found naturally Figur'd into *Cubes*. CRYSTAL grows in moſt Countries, both cold and hot: The *Globous*, eſpecially in *Bohemia* and *Sileſia*. *GREWS's Muſ. Regal. Societ. Pag.* 284.

Dr. Grew, in the ſame place, takes notice of a Maſſy Piece of CRYSTAL, now in poſſeſſion of the ROYAL SOCIETY: He ſaith, it is not pointed, nor angular; but of a roundiſh Figure; much bigger than any Man's Head. One way, near a Yard in compaſs; the other, above three Quarters. In Weight, Thirty Nine Pounds and a quarter *Haverdupoiſe*. Yet it is very clear, beyond the cleareſt *Ice* of the ſame thickneſs. The biggeſt Piece of CRYSTAL the *Dr.* ſays he finds mention'd elſe-where, is a Ball of thirty ſix Ounces in *Septalius's Muſæum*.

It hath been much Controverted amongſt the Learned, concerning the Original of CRYSTAL. *Pli-*

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ny will have it, that it is made by the most Violent Frost from Snow or Ice. But *Georgius Agricola*, in his *De Natura Fossilium*, saith, it is some Sap Congeal'd by Cold in the Bowels of the Earth. Both these Opinions have had their several Champions; and though the first be most Generally receiv'd; yet the Learned *Dr. Brown* will by no means admit of it.

The EMERALD is a Clear Transparent Gem, of a very beautiful and Glorious Green Colour, and is either *Oriental* or *Occidental*. The *Oriental* are the harder, more Beautiful and Precious; found in *Scythia*, *Egypt* and *Cyprus*. The *Occidental* are worse, being had in *Peru*, and several Parts of *Europe*.

Monsieur Chapuzeau, in his History of the Riches of the *East* and *West*, affirms, that EMRALDS are never to be found in the *East-Indies*, but in *Peru*, whence they were carried by that Trading People to the *Moluccas*,

Moluccas, even before *America* was Diſcover'd by the *Europeans*; and ſo they came from the *Orient*; of much leſs value now, than they were formerly, by reaſon of their Commonneſs. The Author notes, that EMRALDS grow in Stones, juſt as *Cryſtals*, forming a Vein, in which they are by little and little refined and thickned: And that ſome of them are ſeen, half White and half green; others, all White; and others all Green and perfect. *PHILOS. TRANSACT. Numb.* 23. *Pag.* 430.

The Learned and Ingenious *Dr. Grew* ſaith, that there is in *Greſham Colledge*, a *Clear* and *Green Stone*, (a kind of *Smaragdus*) which being heated red hot, ſhineth in the Dark for a conſiderable time, *ſc.* about ¼ of an Hour. Given by *Dr. William Crown*. *Dr. Grew* ſays, He tried the Experiment himſelf; and at the ſame time obſerv'd, that as it grew hot in the Fire, its Green Colour was changed into a Sky-Blue; which

which it likewise retain'd so long as it continued to shine: But after that, recover'd its Native Green again. *GREW's Mus. REG. SOCIET. Pag.* 287.

The RUBY or CARBUNCLE, is either White or Red; The White are unripe; for that is their Primary Colour; then as they grow to perfection, they grow to a Rose Red, and at last they become as Red as Blood.

The best come from *Ceilan* and *Pegu*; the worse and lesser are found in *Calicut*, *Bisnagar*, *Coria*, and *Camboia*, being found in the same Mines with the *Saphire*. It is a most Transparent Red Gem, and so hard as not to be touch'd with a File. The best are the Hardest and Coldest, (which you may perceive by your Mouth and Tongue) and such (as *Isidore* saith) shine in the Dark.

Pliny saith, that among the Red Gems, the RUBIES or CARBUNCLES, challenge the first Place. It is

is called in Greek πυρωπὸς, from its likeneſs unto Fire, and yet the Fire hath no Power over it, which is the reaſon that ſome call them Ἀπυρώπους. There are, ſaith he, ſeveral ſorts of RUBIES, among which there is the *Male* and the *Female*; thoſe are taken for the *Male*, whoſe red is briskeſt, and moſt Fire-like. He tells us, that the *Æthiopians* were wont to ſteep their dusky-dark RUBIES in Vinegar; and that in fourteen days they would be pure and reſplendent, and that for fourteen Months they would hold it. In concluſion, he ſays, that it is a very difficult thing to diſtinguiſh the ſeveral ſorts of RUBIES one from another; in that they are ſo eaſie to be counterfeited and falſified by the Art and Skill of *Lapidaries* and *Goldſmiths*, who commonly lay ſome foil under, to make them ſhine and gliſter like Fire. *PLIN. Lib.* 37. *Cap.* 7.

The Natives of *Pegu* call all colour'd Stones RUBIES, diſtinguiſh-

ing them only by the colour. *Saphirs* they call Blue-Rubies; *Amethysts* they call Violet-Rubies; *Topazes*, Yellow-Rubies; and so of other Stones.

Tavernier saith, that among all the RUBIES found in the Mountain *Capelan*, within the Kingdom of *Pegu*, you shall hardly see one of three or four *Carats* that is absolutely clean, by reason that the King strictly enjoyns his Subjects not to export them out of his Dominions; besides that, he keeps to himself all the clean Stones that are found. So that *Tavernier*, as himself informs us, got very considerably in his Travels, by carrying RUBIES out of *Europe* into *Asia*. And this may very well render the Relation of *Vincent le Blanc* suspicious, who reports, that he saw in the King's Palace, RUBIES as big as Eggs.

The other place where RUBIES are found, is a River in the Island of *Ceylan*, which descends from certain high Mountains in the mid-

dle

dle of the Iſland; which ſwells very high when the Rains fall; but, when the Waters are low, the People make it their buſineſs to ſearch among the Sands for RUBIES, *Saphirs*, and *Topazes*. All the *Stones* that are found in this *River*, are generally fairer and clearer than thoſe of *Pegu*.

There are alſo ſome RUBIES, but more *Balleis-Rubies*, and an abundance of *Baſtard Rubies*, *Saphirs* and *Topazes*, found in the Mountains that run along from *Pegu* to the Kingdom of *Camboya*.

In *Hungary* there is a *Mine* where they find certain *Flints* of different bigneſs, ſome as big as Eggs, ſome as big as a Mans Fiſt, which being broken, contain a RUBY within, as hard and as clean as thoſe of *Pegu*. *TAVERN. Trav.* in *India*, *Part.* II. *Book.* II. *Chap.* XVI.

The SAPHIRE, is either *Oriental* or *Occidental*; and of each there are *Male* and *Female*. The *Oriental* are found in *Zeilan*, *Calecut*,

cut, *Biſnagar*, and *Pegu*, in which laſt place are the beſt. The *Occidental* are found in *Sileſia* and *Bohemia*. It is a glorious, clear tranſparent Blue, or Skye-colour'd Stone; theſe are the *Males*. The *Females* are white, and unripe; ſo they want colour. The moſt tranſparent and deep colour'd, are eaſily diveſted of that Beauty, by a little heat of the Fire.

The SAPHIRE is cut or faſhion'd with *Emery* and *Tripoly*; and engraven with *Diamond-Duſt*, as other harder *Gems*.

Ulyſſes Aldrovandus in his *Muſæum Metallicum*, affirms, that *Æs uſtum* and *Glaſs* melted together, imitate a SAPHIRE.

The TURCOIS or TURKEY STONE, is of a dark Sky-colour, and ſometimes greeniſh withal, or greeniſh Blue. This Stone is no where to be found but in *Perſia*: Where there are two *Mines*. The one is called the *Old Rock*, three days Journey from *Meched*, toward

ward the North-weſt, near a great Town which goes by the Name of *Michabourg*. The other, which is call'd the *New-Rock*, is five days Journey off.

Thoſe of the *New-Rock* are of a Paler Blue inclining to White, and leſs eſteem'd, ſo that you may have a great many for a little Money. Some Years ſince the King of *Perſia* Commanded, that no *Turquoiſes* ſhould be digg'd out of the *Old Rock*, but only for himſelf; making uſe of thoſe *Turquoiſes* inſtead of *Enamelling*, to adorn Hilts of Swords, Knives and Daggers: of which the *Perſians* are altogether ignorant. *See* TAVERN. TRAV. *in* India, *Part* II. *Book* II. *Chap* XVI.

The beſt TURQUOIS, according to *Pliny*, is that which comes neareſt to the Graſs Green of an *Emrald*; though after all, he ſays, whatſoever Beauty is in this Stone, ſeems to come from outward helps: For being ſet in Gold, it looks moſt Beautiful, nor is there any Preci-

cious Stone that becomes Gold better.

The fairer a TURQUOIS is, the sooner it loses the Colour, by Oil, Ointment, or Wine; whereas one of a baser sort, will much better hold its own, and maintain the Luster. In Conclusion, He tells us, that of all *Gems* the *Turquois* is the easiest to be falsified, and counterfeited with Glass. *PLIN. Lib. 37. Chap. 8.*

Observations concerning the LOADSTONE, *and the Sea* COMPASS.

THe LOADSTONE, *Magnes*; from *Magnesia*, a Country between *Thessaly* and *Macedonia*, where, it's said, it was first found. For the most part of an *Iron*-Colour, tending to *Blue*, by some called *The Male*; if Black, *The Female*. It is of a *Metallic* or *Iron* Matter, usually found in *Germany*, *Norway*,

Norway, *Italy*, *&c.* about ... of *Mines*.

The admirable and known Properties of this Stone, are, in general, theſe; That it attracteth *Iron*; or any Body, if ſmall, which hath Iron in it. That it hath no perception of any other Body, though never ſo light. That it maketh the Attraction according to its Poles. And that it communicateth to Iron both the ſame Attractive Power, and a Verticity to the *North-Pole*. In which laſt lieth its great Uſe, as applied to *Navigation*. Although by Obſervations made from the *Variation* of the Needle, Time may produce further Diſcoveries in *Aſtronomy*. Thoſe that Travel through the vaſt Deſarts of *Arabia*, have alſo a *Needle* and *Compaſs*, whereby they direct themſelves in their way, as *Mariners* at *Sea*.

The Power of the MAGNET dependeth not on its Bulk; the ſmaller being uſually the ſtronger. *Tergazi* mentions one that would

cut- pend Sixty times, and Mr. *Boyle* another, Eighty times, its own Weight. But the Beſt in time loſe very much of their ſtrength; as thoſe now kept in GRESHAM COLLEDGE have done.

Some Means have been propoſed for preſerving the ſtrength of a LOADSTONE. But there is none mentioned by any Author, that I know of, comparable to That, Experimented by Mr. *Theodore Haac*, Fellow of the ROYAL SOCIETY; not only for Preſerving, but alſo Recovering and Encreaſing the ſtrength of the LOADSTONE. For he having one that weigh'd about four Ounces and a half arm'd, which would take up Sixteen times its own Weight: And having laid it by for the ſpace of ſome Years unus'd, found it to have loſt one Fourth part of its ſtrength, ſo that it would now take up but about three Pound; and, upon ſearch, meeting with no Means Effectual to recover it; conſider'd with himſelf,

That

That as in *Morals*, the Exerciſe of Virtue, makes it more generous; and that *Animal* Motions, by uſe, become more Vigorous: So it might poſſibly prove alſo as to ſome Properties of *Inanimate* Bodies. Whereupon, he hung as much at his Stone, as it would bear; and ſo left it for the ſpace of ſome Weeks. Then, returning to it, and applying more Weight to the former, it very eaſily held the ſame. And repeating the Addition of more Weight, at ſeveral Periods, in the ſpace of about Two Years; He at laſt found, That his Stone had not only recover'd its former ſtrength, but encreas'd it; for whereas before he had never known it to take up more than Sixteen, it would now take up Twenty times its own Weight. And he is now continuing the Experiment, to ſee how far it will go further. *GREW's Muſ. Reg. Societ.* pag. 317, 318.

Dr. Highmore tells us, That the *Magnetical* Exſpirations of the LOAD-

LOADSTONE may be discover'd by the help of Glasses, and be seen in the form of a Mist, to flow from the LOADSTONE: This, indeed, would be a most incomparable Eviction of the Corporeity of *Magnetical Effluviums*, and sensibly decide the Controversie. But I am sure he had either better Eyes, or else better Glasses than ever I saw (tho' I have looked through as good as *England* affords,) and the best of them all was so far from presenting these subtile Emanations, that they would never exhibit to me those grosser, and far more Material, *Effluviums*, from *Electrical* and *Aromatical* Bodies: Nay, not the Evaporations of *Camphire*, which spends it self by continually *effluviating* its own Particles: Nay, I could never see the grosser Steams, that continually transpire out of our own Bodies, and are the fuliginous Eructations of that Internal Fire, which constantly burns within us. Indeed, if our *Dioptricks*

tricks could attain to that Curiosity, as to grind us such Glasses as would present the *Effluviums* of the *Magnet*; we might hope to discover all *Epicurus's Atoms*, *Des Cartes* his *Globuli Aetherii*, and all those insensible Corpuscles which daily produce such considerable Effects in the Generation and Corruption of Bodies about us: Nay, might not such *Microscopes* hazard the discovery of the Aerial *Genii*, and present even *Spiritualities* themselves to our view? *HENR. POWER's Experim. Philosophy. pag.* 154, 155.

Andreas Libavius, *lib.* 2. *Singul.* affirms, that the LOADSTONE, if it be put into Fire, loseth its attractive force; and that whilst it burns, the *Sulphureous* Particles fly forth.

Baptista Porta, in his *7th.* Book, *Chap.* 2. saith, that he hath often seen with great delight, a LOADSTONE wrapt up in burning Coals that sent forth a blue Flame, which

smelt

ſmelt of Brimſtone and Iron; and that being diſſipated, it loſt its attractive Virtue.

Mr. *Samuel Colepreſs*, in a Letter to the ingenious Mr. *Oldenburg*, giving an account of ſome *Magnetical* Experiments, acquaints him, That he had taken a LOADSTONE unpoliſh'd, which attracted but meanly; and that he had heated a *Lath-nail* glowing hot, nimbly applying the North-Pole of the ſaid *Magnet* to it, which quickly took it up, and held it ſuſpended a great while, till he put down both the *Magnet* and *Nail.*

He further ſaith, that he took the ſame Stone, and caſt it into the Fire, letting it remain there, till it was thorough hot, altering its colour from black to red, and that being red-hot, he applied the North-Pole to another *Lath-nail* cold, and untoucht before, which it took up but faintly, yet held it ſuſpended for ſome time.

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In concluſion, he ſaith, that two or three days after, he took the very ſame LOADSTONE, and found that it attracted then as ſtrongly, as before it was caſt into the Fire. Whence he inferr'd, that the Fire ſomewhat leſſen'd its attractive Faculty, but did not deprive the Stone of it. *PHILOS. TRANSACT. Numb.* 27. *pag.* 500, 501.

Dr. *Edward Cotton* made a Preſent to the ROYAL SOCIETY of a LOADSTONE, that weighed ſixty Pounds. Dug out of the Ground in *Devonſhire*. Which though it takes up no great Weight, yet moves a *Needle* nine foot diſtant. Some part hereof, which was broken off, being put into its proper place, adds much Strength to it. *PHILOS. TRANSACT. Numb.* 23, *pag.* 423.

Of the Sea COMPASS.

IN the Year *Thirteen Hundred*, One *Flavio* of *Malphi*, in the Realm of *Naples*, found out the COMPASS, or *Pixis Nautica*, conſiſting of Eight *Winds* only, the Four *Principal*, and Four *Collateral*: and not long after, the People of *Bruges*, and *Antwerp*, perfected that Excellent Invention; adding Twenty-four other Subordinate *Winds* or *Points*. By means of this moſt Excellent Inſtrument, and withall by the good Succeſs of *Columbus*, the *Portugals* Eaſtwards; the *Spaniards*, Weſtwards; and the *Engliſh*, Northwards; have made many Glorious and Fortunate Expeditions: Which had been utterly impoſſible to have been perform'd, and had been fooliſhly undertaken, when that help Was wanting. I know there hath been much Pains taken by ſome Learned men, to prove

prove the use of the *Mariners Compass* to be far more Ancient, than is now commonly pretended. *Nicolas Fuller*, a very Learned and Industrious Man, but better skill'd in the *Hebrew* Tongue, than the *Philology* of the *Greeks* and *Latines*, will have it known to *Solomon*, and by him taught unto the *Tyrians* and *Phœnicians* (the most famous *Seamen* of Old Times): but he brings no Argument of Weight to make good the Cause. Nor is it possible that such an Excellent Invention, so beneficial to the common good of all Mankind, should have been forgotten and discontinued, for the space of more than Two Thousand Years; if ever the *Tyrians*, and *Phœnicians* had been Masters of it; who could not possibly conceal it (had they been so minded) from the *Common-Mariners*, or they not have Communicated it for gain, or desire of Glory, to the *Greeks*, and *Romans*; under whom successively they liv'd. And as little moment do I find in some

ſome other Arguments, as that the *Lapis Heraclius* of the Ancient Writers, or the *Verſoria* of *Plautus*, ſhould be by them intended for the *Mariners Compaſs*. For plainly the *Verſoria* of *Plauturs* is no other than the Piece of *Tackle* which our *Mariners* now call the *Bolin*; by which they uſe to turn their Sails, and fit them to the change of every Wind. And ſo much doth appear by the Poet himſelf, in the Comedy which he calls *Mercator*; ſaying, *Hinc ventus nunc Secundus eſt, cape modò Verſoriam.* So called from *Verſo*, to turn often; or from *Verſum*, the firſt *Supine* of *Verto*; Whence *Velum Vertere* is a common Phraſe amongſt the *Latines*, us'd for the ſhifting of the Sail, as the Wind doth vary. *PET. HEYLIN's Coſmog.*

But as peremptory as *Heylin* is, in the aſſigning this Noble Invention to *Flavius* the *Neapolitane*, yet I find other Authors (it may be of as good Credit and Authority) wholy

wholly differ from him. *Dr. Gilbert*, our Country-Man (who hath written an Excellent *Latin* Treatiſe of the Properties of the LOADSTONE) ſeems to be of Opinion, that *Paulus Venetus* brought the Invention of the Uſe of the COMPASS from the *Chineſes*. *Paulus Oſorius*, in his Diſcourſe of the Acts of King *Emanuel*, aſcribes it to *Gama* and his Country-Men the *Portugals*, who, as he pretends, took it from certain Barbarous *Pyrats*, Roaving upon the *Sea* about the *Cape* of *Good Hope*. *Goropius Becanus* likewiſe thinks, he has great Reaſon to intitle it upon his Countrey-Men the *German's*, in as much as the 32 Points of the Wind upon the COMPASS borrow the Name from the *Dutch* in all Languages. But *Blondus*, who is therein follow'd by *Pancirollus*, both *Italians*, will not have *Italy* loſe the Praiſe thereof, telling us, that about 300 Years ago it was found out at *Malphis* or *Melphis*, a City in the Kingdom of

Naples: But for the Author of it, the *One* Names him not, and the *Other* assures us, he is not known: Yet *Salmuth*, out of *Ciezus* and *Gamara*, confidently Christens him with the Name of *Flavius*. To conclude then, who it was, that first discover'd this Noble, useful Invention, is not certainly known. And, is it not pity, that one of the *Greatest Benefactors* to Mankind that ever was, should lie hid in so neglected an obscurity? When the great Disturbers of the World, have so dear, and so precious a Memory. For my part, I think there is much more acknowledgment due to this obscure Fellow, (if it be *Flavius*) than to a Thousand *Alexanders* and *Cæsars*, or to Ten times the Number of *Aristotles*. And He really did more for the increase of Knowledge, and the Advantage of the World, by this one Invention; than the whole Tribe of *Schoolmen* have done by their many niceties, and subtile Disputations.

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In the *Philosophical Transactions, Number* 157, *Pag.* 520. we meet with a very Remarkable Account concerning the COMPASS of a Ship, *viz.* of its changing its *Poles* in a Thunder-Storm.

There are Three Kinds of Sea-COMPASSES; the First, the plain *Meridional* COMPASS. The Second, a COMPASS *of Variation.* The Third, a *Dark* COMPASS.

Observations concerning PETRIFICATION.

OF PETRIFYING *Waters*, tho' I doubt not but their Kinds are as various, as the Effects they produce; and the Effects again, as the Subjects they Work on; yet I am inclin'd to believe, that they all agree thus far, that they proceed in the Main from the same Stock and Linage, and are all more or less of the Kindred of S A L T S, which sublimed and rarified in the

Bowels of the Earth into an invisible Steam, are receiv'd by the *Waters* as their most agreeable *Vehicle*, and brought hither to us at the Rising of *Springs*, as invisibly as the Particles of *Silver* or *Gold*, when each is dissolved in its proper *Menstruum*: Where meeting perchance with an ambient *Air*, much colder and chilling than any under Ground, in all likelyhood are *precipitated*, and thrown down on such Subjects, as they casually find at the place of their *Exit*, which they presently Cloath with a *Crust* of *Stone*; or else (where *Precipitation* or *Cohesion* will not suffice) they pass with the *Waters* through the *Pores* of the Subjects, and are left behind in them just as in a *Filter*.

The Reason of which difference may probably be, that some of these PETRIFYING Steams or Atoms, may be gross and more bulky, than some others are, and cannot be held up in the watry *Vehicle*, without such a Heat as they have under Ground,

Ground, but fall, and by Reaſon of their bigneſs, do not *penetrate*, but *adhere* to their Subjects; whereas others that are fine, more minute, and ſubtile, are eaſily ſupported in a *Volatile* Condition, and paſs with the *Waters* into the cloſeſt *Textures*.

If any body doubt whether *Stones*, and ſo PETRIFICATIONS, ariſe from SALTS, let him but conſult the *Chymiſts*, and ask whether they find not all *indurated* Bodies, ſuch as Stones, Bones, Shells, and the like, moſt highly ſated with the *Saline* Principle? Some Mixture of *Earth* and *Sulphur*, 'tis true, there is in them, which give the *Opacity* that moſt *Stones* have; from which, according as they are more or leſs free, they have proportionable *Tranſparency*, and ſome hardneſs too; as the beſt of *Gems*, the *Diamant*, evinces. And if he ſhall ask what SALTS are the aptſt to perform this Feat of PETRIFICATION, though the difficulty

of the Queſtion might well excuſe me, yet I'll venture thus far to give him an Anſwer, That I have frequently ſeen at *Whitſtable* in *Kent*, how their *Coperas* or *Vitriol* is made out of *Stones*, that 'tis more than probable were firſt made out of *That*: To the Spirit of which *Vitriol*, if you add Oyl of *Tartar*, they preſently turn into a fix'd and ſomewhat hard Subſtance, not much inferior or unlike to ſome Incruſtations; which ſeems to conclude, that from theſe Two, all ſuch like *Concretions* are probably made; and that could we but admit that *Ocean* of *Tartar*, which *Plato* plac'd in the *Center* of the *Earth*, and thought the Origin of all our *Springs*, the buſineſs of PETRIFICATIONS were ſufficiently clear. To which I alſo add in the behalf of *Vitriol*, what's matter of Fact, and prevails with me much, That where-ever I find ſtrong *Vitriol*-Waters, the PETRIFYING ones are ſeldom far off. *PLOT's Nat. Hiſt. of OXFORD-SHIRE.*

The

The Ingenious, and Learned *Mr. Hook* ſaith, that all the PETRIFIED Pieces of *Wood* that he ever ſaw, ſeem'd to have been rotten *Wood* before the PETRIFICATION began. And ſince I have Named this Induſtrious and knowing *Gentleman*, I ſhall not think my time ill ſpent, if (for the Entertainment of the Reader) I Tranſcribe the Obſervations he hath made of a Piece of PETRIFIED *Wood*, taken from a *Microſcopical Examen.*

This PETRIFY'D Subſtance reſembled *Wood*, in that

Firſt, all the parts of it ſeem'd not at all *diſlocated*, or alter'd from their Natural Poſition whiles they were *Wood*; but the whole Piece retain'd the exact ſhape of *Wood*, having many of the Conſpicuous *Pores* of *Wood* ſtill remaining *Pores*, and ſhewing a manifeſt difference, viſible enough, between the *Grain* of the *Wood* and that of

the *Bark*; eſpecially, when any ſide of it was cut ſmooth and polite; for then it appeared to have a very lovely *Grain*, like that of ſome curious cloſe *Wood*.

"Next (it reſembled *Wood*) in "that all the ſmaller, and (if I may ſo "call thoſe which are only to be "ſeen by a good Glaſs) *Microſcopical* "*Pores* of it appear, (both when "the Subſtance is cut and poliſh'd "*Tranſverſly*, and *Parallel* to the "*Pores*) perfectly like the *Micro-* "*ſcopical Pores* of ſeveral kinds of "*Wood*, retaining both the ſhape, "and Poſition of ſuch *Pores*.

"It was differing from *Wood*,

"Firſt, in *Weight*, being to Com- "mon *Water*, as $3\frac{1}{4}$ to 1. Where- "as there are few of our *Engliſh* "Woods, that, when dry, are "found to be full as heavy as *Wa-* "*ter*.

"Secondly, in *Hardneſs*, being "very near as hard as a *Flint*, and "in

"in ſome places of it alſo reſem-
"bling the Grain of a *Flint*: It
"would very readily Cut Glaſs, and
"would not without difficulty (e-
"ſpecially in ſome parts of it) be
"ſcratch'd by a Black hard *Flint*:
"It would alſo as readily ſtrike Fire
"againſt a *Steel*, as alſo againſt a
"*Flint*.

"Thirdly, in the *Cloſeneſs* of it;
"for, though all the *Micrоſcopical*
"*Pores* of the *Wood* were very Con-
"ſpicuous in one poſition, yet by
"altering that poſition of the Po-
"liſh'd Surface to the Light, it was
"alſo manifeſt that thoſe *Pores* ap-
"pear'd darker than the reſt of the
"Body, only becauſe they were
"fill'd up with a more Dusky Sub-
"ſtance, and not becauſe they were
"hollow.

"Fourthly, in its *Incumbuſtible-*
"*neſs*, in that it would not burn in
"the Fire; nay, though I kept it a
"good While red-hot in the Flame
"of a *Lamp*, made very *Intenſe* by
"the Blaſt of a ſmall *Pipe*; yet it
"ſeem'd

"ſeem'd not at all to have dimi-
"niſh'd its extention; but only I
"found it to have chang'd its Co-
"lour, and to have put on a
"more Dark and Dusky Brown
"*Hue*. Nor could I perceive that
"thoſe parts which ſeem'd to have
"been *Wood* at firſt, were any thing
"waſted, but the Parts appear'd as
"Solid, and Cloſe as before. It
"was farther obſervable alſo, that
"as it did not Conſume like *Wood*;
"ſo neither did it Crack and Fly
"like a *Flint*, or ſuch like hard
"*Stone*; nor was it long before it
"appear'd *red-hot*.

"Fifthly, in its *Diſſolubleneſs*; for
"putting ſome drops of *Diſtill'd Vi-*
"*negar* upon the Stone, I found it
"preſently to yield very many
"*Bubbles*, juſt like thoſe which
"may be obſerv'd in *Spirit* of *Vi-*
"*negar* when it Corrodes *Coral*;
"tho' I gueſs many of thoſe *Bubbles*
"proceeded from the ſmall parcels
"of *Air*, which were driven out of
"the Pores of this PETRIFIED ſub-
"ſtance

" ſtance, by the inſinuating Liquid " *Menſtruum.*

" Sixthly, in its *Rididneſs*, and " *Friability*; being not at all *Flexi-* " *ble*, but *Brittle* like a *Flint*; in- " ſomuch that with one knock of a " *Hammer* I broke off a ſmall piece " of it, and with the ſame *Hammer* " quickly beat it to pretty fine *Pow-* " *der* upon an *Anvil.*

" Seventhly, it ſeem'd alſo very " differing from *Wood* to the *Touch*, " feeling more Cold than *Wood* uſu- " ally does, and much like other " cloſe *Stones* and *Minerals.*

The Reaſons *of all which* Phœno- mena *ſeem to be*:

" That this PETRIFIED *Wood* " having lain in ſome place where " it was well ſoak'd with PETRI- " FYING Water (that is, ſuch a " *Water* as is well impregnated with " *Stony* and *Earthy* Particles) did by " degrees ſeparate, either by *Strain-* " *ing* and *Filtration*, or perhaps by " *Præcipitation*,

" *Præcipitation, Cohæsion* or *Coagu-*
" *lation*, abundance of *Stony Parti-*
" *cles* from that permeating Water:
" Which *Stony Particles* having, by
" means of the fluid *Vehicle*, con-
" vey'd themselves not only into
" the *Microscopical Pores*, and so
" perfectly stop'd them up; but al-
" so into the *Pores*, which may per-
" haps be even in that part of the
" *Wood*, which, through the *Micro-*
" *scope*, appears most solid; do there-
" by so augment the Weight of the
" *Wood*, as to make it above three
" times heavier than *Water*, and
" perhaps six times as heavy as it
" was when *Wood*: Next, they
" hereby so lock up and fetter the
" parts of the *Wood*, that the *Fire*
" cannot easily make them fly a-
" way, but the Action of the Fire
" upon them is only able to *Char*
" those parts as it were, like as a piece
" of *Wood*, if it be clos'd very fast
" up in *Clay*, and kept a good while
" Red-hot in the *Fire*, will by the
" heat of the *Fire* be *Char'd*, and

" not

" not Conſum'd; which may per-
" haps be the Reaſon why the PE-
" TRIFIED *Subſtance* appear'd of a
" blackiſh Brown Colour after it had
" been burnt.

" By this intruſion of the *Petri-*
" *fied Particles*, it alſo becomes *hard*
" and *friable*; for the ſmaller *Pores*
" of the *Wood* being perfectly ſtuf-
" fed up with theſe *Stony Particles*;
" the *Particles* of the *Wood* have
" few or no *Pores* in which they
" can reſide, and conſequently, no
" *Flexion* or yielding can be caus'd
" in ſuch a *Subſtance*.

" The remaining *Particles* like-
" wiſe of the *Wood*, among the *Stony*
" *Particles*, may keep them from
" cracking and flying, as they are
" very apt to do in a *Flint*. *HOOK*'s
" Microg. *Obſerv. XVII.*

Among the ſeveral Kinds of the PETRESCENT Liquors, I have obſerved a ſort that is of ſo fine a Subſtance, and yet of ſo PETRIFYING a Vertue, that it will Penetrate and PETRIFY Bodies of very

very different Kinds, and yet ſcarce, if at all, viſibly increaſe their bulk, or change their Shape or Colour. To which purpoſe, I Remember, that I have ſeen divers *Animal* and *Vegetable* Subſtances ſo PETRIFIED, as ſcarce at all to be taken notice of, by their appearance, to have been alter'd by the Operation of the PETRESCENT Liquor. I have with Pleaſure ſeen a thin *Cream-Cheeſe* turn'd into Stone, where the Size, Shape, and Colour even of the Wrinckles, and the blueiſh Mold (which it ſeems it began to have when the Liquor Invaded it) were ſo well preſerv'd, that an Hungry Man would not have ſcrupl'd to have fallen upon it as a good Bit. And as for the *Hardneſs*, that this PETRESCENT Juice can give to the Body that it Penetrates, I ſhall only tell you, that I have had (and I think yet have) a pretty quantity of *Wood*, PETRIFIED in *England*, which retaining its former Figure, and Grain, and ſcarce at all

all visibly increas'd in Bulk, was so very *hard*, that I could make Impressions with it upon *Iron*, and *Glass* it self, and make it strike Fire like an Excellent *Flint*. To which I shall here add, that the *Stone parts* did not suffer the *Wood*, which they had *Penetrated*, to be reduc'd in the Fire, either to *Ashes* or *Charcole*. And I have by me a Lump of *Mineral* Substances, wherein a PETRESCENT Liquor, that fills the large Intervals between them, is Transparent enough, and *harder* than most *Stones*, as far as we could guess by some tryal of it made by a skilful Ingraver of *Gems*. And to these Instances might be added many others, if it did not by these few sufficiently appear, that PETRIFICK *Agents* may insinuate themselves into the *Pores* of Various Bodies, and turn them into *Stone*, without otherwise destroying their Pristine Nature, or so much as their Former Figure. *BOYLE of Gems, Pag.* 124, 125.

Where

Where there are PETRESCENT Liquors mingled with common Water, there may, by divers accidents, and particularly an hot Summer, a ſufficient Diſcharge be made of the ſuperfluous Moiſture, to make the more diſpoſed parts of the PETRESCENT Liquor to *Coagulate*; and afterwards the *Coagulation* may be ſuſpended, either by the ſupervening of a Colder Seaſon, as Winter; or even in Summer it ſelf, by a plentiful Rain, or the effect of it, a Land-Flood, which might check the progreſs of *Coalitions* by over much *diluting* the Liquor, that might elſe have turn'd into *Stone*. *BOILE ibidem, pag.* 143.

For ought we know, in thoſe very Places, where now there is nothing to be ſeen but *looſe Stones*, and perhaps *Beds of Stone* themſelves, in thoſe very Places (I ſay) there may in times paſt have been PETRESCENT Liquors, whether Stagnant or Running.

For

For, I have in another place ſhew'd, that Earthquakes, Inundations of Seas and Rivers, Sinkings of Ground, Incroachments of the Land on the Water, Fiery Eruptions, and other ſuch Accidents, (ſome related by Authentick Authors, and others happening in our own times, in places, ſome of which I had the curioſity to ſee,) have among other odd Effects, been able to dry or choak up Pools and Lakes, and to ſtop and quite divert the courſe not only of *Springs*, but of *Rivers*, ſo as to leave no Footſteps of them, where they plentifully flow'd before. *IDEM Ibid. pag.* 157.

Obſervations concerning SALT: *Several ſorts thereof.*

COmmon SALT is the *Coagulum* of Sea-Water, or of *Salt* Fountain-Water; but that of the

Sea is the chief. It is purified by Solution, Filtration, and Coagulation, or Cryſtallization. It is to be noted, that the artificial SALT of *Vegetables* and *Animals* are ſubject to the ſame Preparations which common SALT is ſubject to. If the Solution and Cryſtallization be often repeated, this common SALT will at laſt be ſweet.

The SAL ARMONIAC of the *Ancients* was a Native SALT, which grew in the *Lybic* Sea, unknown to us: *Ours* is a Compound Artificial Volatile SALT, boiled from the Aſhes of Minerals, Vegetables, and Animals, Salt of Soot, common SALT, and Sal Gemme. The beſt comes from *Venice* and *Antwerp*, being very white and pure.

Among all the SALTS that Nature alone produceth, the ſcarceſt, but of greateſt Vertue, is the SALT-AMMONIAC; they call it vulgarly ARMONIAC, and from that Name conclude, that it comes from

from *Armenia*; but that is not the true name of it but AMMONIAC, which in *Greek* ſignifies, SALT of the *Sand*: and underneath the *Sand* (of the Sea-ſhore, I ſuppoſe) it is found congeal'd in little pieces by its internal Heat, and the continual burning of the Sun, baked ſo much that it is made the bittereſt to taſt of all kind of SALT. *Goldſmiths* uſe it more than the *Phyſicians*. It is one of thoſe they call *The four Spirits*, becauſe the *Fire* will convert them into Smoak, and ſo they fly away: The other three are *Quick Silver*, *Sulphur*, and *Salt Peter*. It hath a particular Property to cleanſe and colour *Gold*, and is put into the Compoſition of that *Aqua fortis* that diſſolves it. *ALBARO ALONSO BARBA of* Metals. *Tranſl. by the Earl of SANDWICH. Chap.* 8.

Johannes Alphonſus Borellus in his *Hiſtoria & Meteorologia Incendii Ætnæi, Ann.* 1669. takes particular notice of the great abundance of

SAL ARMONIAC, that was found in all the holes and vents of the Ground, and in the Cleſts of Stones. And of this SALT *He* affirms, that there had been *ſublimed* (for he makes it *factitious*) ſo great Store, that many thouſands of Pounds might be gather'd; adding, that even a whole Year after the Extinction of the *Fire* in the Mouths of ÆTNA, there were found remaining divers vents about *Catania*, exhaling ſtore of Smoak, which had the like SAL ARMONIAC ſticking to the ſides and edges of the Stones.

At this day, we have little knowledge of the true NITRE, which was anciently made of the Water of the River *Nilus*; although *Albertus Magnus* ſaith, that in *Goſelaria* there was a Mountain that contained a very rich Mine of *Copper*, and that the Water which iſſued out at the bottom of it, being dried, became NITRE. We know little alſo of *Aphronitrum*, which

is

is but as it were *the froth* of NITRE.

NITRE is bitterer than *Salt*, but leſs Salt. SALT PETER is the Mean between them two, and conſiſts of very dry and ſubtile parts; it grows on the Walls of old Houſes, and in Stables, Cow-Houſes, Hog-Sties, and Dove-Coats; it will grow again in the ſame Earth it was taken out of, if that Earth be thrown in heaps, and not ſtirr'd, and taken care of; or if ordinary Earth be caſt up into heaps, and water'd with Brackiſh Water, after ſome Years it will give a great encreaſe, as profitable as Crops of Corn.

The uſe of it in making *Gun-Powder*, and *Aqua Fortis* is very well known. It is us'd alſo in the melting of Metals. *Ibidem.*

Whether the NITRE of the Antients be of the ſame *Species* with the SALT, which is commonly known by the name of SALT PETER, is variouſly diſputed by ve-

ry learned Authors amongst the Modern Physicians: On the *Negative* side are *Mathiolus* and *Belloni-us*; the latter of which had the advantage by the opportunity of his Travels in *Egypt*, to have often seen and handled them both, and is so positive as to pronounce, that in all *Christendom* there is not one Grain of NITRE to be found, unless it be brought from other parts; although at the time of his being in *Grand Caire* (which was about the Year 1550) it was so common there (as he says) that ten Pounds of it would not cost a *Moidin*. Among those that hold the *Affirmative*, the most eminent are *Curdan* and *Longius*; and it seems the general Vote of Learned Men hath been most favourable to that Opinion, by reason that in all *Latin* Relations and Prescriptions, the word NITRUM or HALINITRUM is most commonly used for SALT PETER.

I have

I have often enquired amongſt our *London* Drugſters for *Egyptian* NITRE, and if I had been ſo fortunate as to have found any, I doubt not, but I ſhould have been able to have put an end to that Queſtion by a *Demonſtration*; that is, by turning the greateſt part of it into SALT PETER. However, the Obſervations I have made in my own private Experiments, and in the Practice of SALT PETER-Men, and Refiners of SALT PETER, ſeem to give me ſufficient ground to ſuſpect, that the confidence of thoſe who hold them to be ſeveral SALTS, proceedeth chiefly from their being unacquainted with the various Φαινόμενα of SALT PETER in the making and refining of it: And alſo their comparing double refin'd SALT PETER (of which *Gunpowder* is made) with the NITRUM and APHRONITRUM deſcrib'd by *Pliny*, in the one and thirtieth Book of his *Natural Hiſtory*; which indeed is the only tolerable

lerable account of that SALT, that hath been handed to us from Antiquity; where he tells us, that APHRONITRUM was *Colore pene purpureo*, and *Egyptian* NITRE *Fuſcum & Lapidoſum*. *HENSHAW of the making of SALT PETER. See SPRAT's Hiſt. of the R. S. pag.* 260, 261.

NITRE is often adulterated by being mixed with common SALT, but you may try it by burning; for being fir'd upon a red hot Tile, or Stone, if all fly away, it is pure; but if any thing remain, it is common SALT.

The *Lord Bacon* ſaith, that NITRE is a kind of cool *Spice*; in that it bites the Tongue and Palat with *Cold*, juſt as *Spices* do with *Heat*; and that NITRE is the only *Vegetable*, which aboundeth with *Spirit*, and yet is *Cold*.

He further tells us, that *Cattle* which drink of NITROUS Water, do manifeſtly grow fat; which, *ſaith he*, is a ſign of its cold Quality.

ty. *B A C. Hiſt. of LIFE and DEATH.*

It is affirm'd by ſeveral, that *Gunpowder*, which conſiſteth principally of NITRE, being taken in Drink, doth conduce to Valour; and therefore 'tis often us'd by *Mariners* and *Soldiers* juſt before they are to fight, even as the *Turks* do *Opium*.

The greater Part of *Africa* hath no other SALT but ſuch as is digged out of Quarries and Mines, after the manner of *Marble* or *Free Stone*, being of a White, Red, and Gray Colour. *Barbary* aboundeth with SALT, and *Numidia* is indifferently furniſh'd therewith: But the Land of *Negros*, and eſpecially the inner part of *Ethiopia*, is ſo deſtitute thereof, that a Pound of SALT is there ſold for half a *Ducat*. And the People of that Country uſe not to ſet SALT upon their Tables; but holding a crumb of SALT in their hands, they lick the ſame at every morſel of Meat which they put in their Mouths. In certain

certain Lakes of *Barbary*, all the Summer time, there is fair and white SALT congeal'd or kern'd, as namely, in divers places near the City of *Fez*, *PURCH. Pilgr. Vol. II. pag.* 849.

The Learned and Ingenious Dr. *Brown* in his *Travels, pag.* 112. ſaith, That near the City of *Eperies*, in upper *Hungary*, there is a SALT-Mine of great note, being an hundred and fourſcore Fathoms deep, in which are pieces of Salt found of ten thouſand Pounds weight.

The Principal SALT-Mines are in *Poland* and *Calabria*. In the leſſer *Poland*, ſays *Comer*, in his Deſcription of that Country, are ſome pieces of SALT as big as huge *Stones*; ſo hard, that Houſes and even whole Towns are built with them.

In the *Philoſophical Tranſactions* we have a Relation concerning the SAL-GEMME Mines in *Poland*, lying within a Mile of *Cracovia*: which Relation was communicated to Mr. *Olden-*

Mr. *Oldenburg* by a curious Gentleman in *Germany*, who ſome Years ſince deſcended himſelf into thoſe Mines, to the depth of 200 Fathoms, and was led about in them for the ſpace of three Hours. *He ſaith*, that out of theſe Mines they dig and cut out *three* ſorts of SALT; *One* is common, courſe, and black; the *Second* ſomewhat finer and whiter; the *Third*, very white, and clear, like *Cryſtal*. *He ſays*, the courſe and black SALT is cut out in great pieces, roundiſh, and three *Polonian* Ells long, and one Ell thick, which coſts from fifty to ſeventy *Polonian Florins*: In the mean time the Inhabitants of *Cracow* have a Priviledge, whereby a certain number of Pieces is to be deliver'd to them, at the rate of eight ſuch *Florins* the Piece. The great Pieces lie at *Cracow* about the Streets before the doors of the Citizens; as alſo in the Countrey, in the ſmall Towns and Villages, and before the Forts and Houſes of the Nobility; where

where the *Cattle*, paſſing to and fro, lick of thoſe SALT-Stones; which afterwards by Mills and other Engines are ground and beaten ſmall for uſe.

Theſe SALT-Works belong to the King of *Poland*, who appoints and maintains the Officers of them; and 'tis one of his beſt ROYAL REVENUES, amounting to a very conſiderable Sum. There are no leſs than a thouſand Men that are conſtantly employ'd in theſe Mines; and *be ſaith*, There was then a Proviſion of SALT valued at two Millions.

He farther *ſays*, There are in theſe Works three Horſes that ſtay always below, having their Stable and other Neceſſaries there; the Horſes, after they have been a while under Ground, grow blind from the ſharpneſs of the SALT; and that all the Three, which then Labour'd there, were quite blind. *PHILOS. TRANSACT. Numb.* 61. *pag.* 1099, *&c.*

In

In *Jamaica* they have a very pretty and eaſie way for the producing of good SALT, which is thus: Near the Sea-ſide they dig a low place, as it were a Lough or Pond, and pave it very even, and with a Sluce let in ſome of the Sea-water, an Inch, two Inches, or three Inches deep, or more; and there letting it remain, the Sun in a ſhort time turneth it into SALT: And if they have occaſion to uſe it quickly, they let in the leſs; but if they have a good Stock, that they can ſtay longer, then they let in the more; for the more is let in, the longer will it be e're it become SALT: which being done, they ſweep it up, and keep it for uſe, and ſo let in more. And thus are they well provided with SALT, to Powder their Beef, Pork, &c. which will not keep ſweet otherwiſe many hours after it is kill'd. *HUGHES's American Phyſitian, pag.* 35.

According to the *Quality* of the Earth, or Ground of the *Mariſh*, the

the SALT is made more or leſs white. The Reddiſh Earth maketh the SALT more Gray; the Blueiſh more white. Beſides, if you let run in a little more Water than you ought, the SALT becomes thence more White; but then it yields not ſo much. Generally all the *Mariſhes* require a fat Earth, neither Spungy, nor Sandy.

Unleſs it rain much, the Rain-water does little hurt to the *Mariſh*; and although it rain a day or a night, they do not let the Water which is in the *Mariſh* run out, the heat of the Sun ſufficiently exhaling ſuch Rain-Water. Only, if it have rain'd very plentifully that day, no SALT is drawn for the three or four next following days. But if it rain five or ſix days, the People are then neceſſitated to empty all the Water of the Beds by a peculiar Channel, conveighing it into the Sea; which Channel cannot be opened, but when 'tis low Water. But 'tis very ſeldom

that

that it rains ſo long, as to conſtrain them to empty thoſe Beds.

'Tis Obvious that the hotteſt Years make the moſt SALT; where yet it is to be noted, that beſides the heat of the Sun, the Winds contribute much to it, in regard that leſs SALT is made in calm, than in Windy Weather. The Weſt and North-Weſt Winds are the beſt for this Purpoſe.

In the Beds of the *Mariſh*, where the SALT is made, the Water muſt not be above an Inch and an half deep. Each of theſe Beds is fifteen Foot long, and fourteen Foot broad. Chiefly care is to be taken, that the Earth at the bottom of the Beds mingle not with the SALT. *This Account was communicated to Mr.* Oldenburg *by a* French *Dr. of Phyſick, reſiding in the Iſle of* Rhe, *where Salt is made in a great Quantity.* As you may find in the *PHILOS. TRANSACT. Numb.* 51. *pag.* 1025.

SALT

SALT is that which gives *Ligature*, *Weight*, and *Conſtitution* to things, and is the moſt manifeſt Subſtance in all Artificial *Compoſts*. 'Tis SALT which Fertilizes, and Renders *Egypt* ſo Luxuriouſly Fruitful after the Inundations of *Nile*; and the *Nitrous* Grounds of *Jamaica*, and other places, which cauſe ſo ſtupendious a growth of Plants and Trees. In a Word, SALT may be ſaid to have a *Dominion* almoſt *Monarchical*, in the great Work of *Vegetation*, being ſo abſolute an Ingredient in all our *Dungs* and *Compoſts*.

To Conclude, you know, who have Dignified SALT with the Prerogative of being Nam'd *Element-Earth*, the *Vigour* and *Cloſe* of all Things, yea, the firſt and laſt of *Elementated* Bodies: What ſhall I ſay, *Quid Divinum*, the Original of all *Fecundity*; nor can I ſay leſs, ſince there was nor *Sacrifice*, nor *Diſcourſe* acceptable without it. *EVELYN*'s Diſcourſe of Earth, *in*

ſeveral

ſeveral places, Pag. 312, 313, 314. *Fol.*

See an Account of the SALT Springs at *Nantwich* in *Cheſhire*, by Dr. *William Jackſon*, in the *PHILOS. TRANSACT. Numb.* 53.

And of the SALT Waters of *Droytwich* in *Worceſter*-ſhire, by *Dr. Tho. Raſtell*, in the *PHILOS. TRANSACT. Numb.* 142.

And of the SALT Springs in *Staffordſhire*, by *Dr. Rob. Plot*, in his Deſcription of that County.

Obſervations concerning GOLD.

THE moſt perfect of all Inanimate Bodies, and the moſt eſteem'd of all Mettals is GOLD, univerſally known, and coveted by all People. It is made of the ſame Matter, and in the ſame Manner, as other Mettals are, but of parts ſo pure and perfect, and ſo well compacted together by Decoction, that its ſubſtance is, as it were, in-

corruptible, being out of the Power of any of the *Elements* to be Corrupted or Deſtroy'd. The *Fire* that conſumes all other Mettals, only makes GOLD more pure: The *Air* and *Water*, diminiſh not its Luſtre, nor can *Earth* make it Ruſt or, Waſte. By the Nobleneſs of its Subſtance, it hath moſt deſervedly obtain'd that Eſtimation, which the World gives it, and the Natural Virtue which flows from the admirable Equality of its Compoſition, is the beſt Medicine againſt Melancholly, and the greateſt Cordial to the Hearts of Men, which perpetually run after this Avaritious Mettal, as the *Needle* doth after the *Loadſtone*. The Virtue aſcrib'd to *Aurum Potabile*, to preſerve a Body perpetually in Youthfulneſs without Infirmity; together with the Receit of making thereof, depends upon the Credit of thoſe Authors, who have written concerning the ſame. *ALBARO ALONSO BARBA*,

BA, of Mettals, Tranſlat. by the Earl of Sandwich, *Chap.* 26.

GOLD hath the leaſt Variety of Regular Figure, in the *Ore*, of any *Mettal*. Becauſe more ſolid, and therefore, leſs wanton, than the reſt. 'Tis a rare *Specimen*, mention'd by *Georgius de Sepibus*, which he calls, *Aurum Rameſcens*.

The Ductility of GOLD is admirable; One Grain, in Leaves, is extended to above Fifty Inches Square: And one Ounce employ'd in Guilding ſmall *Hair-Wyre*, will be extended to almoſt an Hundred Miles in lenght; as Mr. *Boyle* hath obſerv'd.

The Uſes of GOLD for Veſſels, Coins, Armour, Garments, *&c.* are infinite. The Luxury of *Galienus* the Emperour, taught him to Powder his Hair with the Duſt of GOLD. Some *Painters*, ſaith *Ambroſinus*, hang Plated GOLD over *Vinegar*, whereby is produc'd a pure *Blue* (as *Ceruſs* out of *Lead*) which they prefer before the *Ultramarine*.

One principal Use of GOLD in *Medicine* is, for the Correction of *Mercurial Medicines*. The Original Use of Leaf-GOLD in *Electuaries*, and divers other Preparations, was not only for *better Grace*, but from the Opinion of its adding Virtue to them. And Plates of GOLD, anciently, have been us'd especially for *Children*, as an *Amulet*. Which I take to be the true Reason, why the Kings of *England* hang a peice of GOLD upon those they *Touch*. *GREW's Musæum REG. SOC. Pag.* 323.

There goes a Tradition among Learned Men, that the *Leaves* of *Vines* that grow in some places of *Hungary*, whose Mines afford GOLD, are as it were *Guilt* on the lower side, by ascending Exhalations of a GOLDEN Nature: Whether this be true or no, I shall not take upon me to determine: But I remember, that having made Enquiry about the Truth of it, of a very Ingenious Traveller, whose Curiosity led him to visit heedfully those

thoſe famous Mines: *He* told me, that he did not remember He had obſerv'd what is Reported about the *Leaves* of the *Vine*: But *He* knew very well, that at *Tockay*, (a place that affords the famouſeſt Wine of *Hungary*, and indeed the beſt I have drunk) very many of the *Kernels* of the *Grapes* would appear *Guilt* over, as it were, with Leaf-GOLD. *ROB. BOYLE of the* Inſalubrity, *and* Salubrity *of the Air.* pag. 44, 45.

At *Chremnitz*, a ſmall Town in *Hungary*, there is a GOLD-MINE, in which they have Work'd theſe Nine Hundred and Fifty Years; the *Mine* is about Nine or Ten *Engliſh* Miles in length, and there is one *Cuniculus* or *Horizontal* paſſage, which is Eight Hundred Fathoms long, called the *Erbſtall*. The depth of it is above One Hundred and Seventy Fathoms; They do not uſe Ladders to deſcend into this *Mine*, but are let down at the end of a Cable, unto which is faſtned a Sling,

or Seat of Leather; the Leather being broad, and divided ordinarily into Two or Three parts, so that it is to be shifted or chang'd as you find Convenience, and affords no uneasie Seat even to such as are not us'd to it. And in this manner, whosoever entreth the *Mine* is let down. Through one of the *Schachti* or perpendicular Pits, of which there are Six. 1. That of *Rodolphus*. 2. Queen *Anne*. 3. *Ferdinand*. 4. *Matthias*. 5. *Windschacht*. and 6. *Leopold*. I went down by the Pit of the Emperour *Rodlophus*, gently descending by the turning about of a large Wheel, to which the Cable is fastned, One Hundred and Eight Fathoms deep into the Earth; and after many Hours being in the *Mine*, was drawn out again by *Leopold*'s Pit, strait up above One Hundred and Fifty Fathoms; a height surpassing that of the *Pyramids*, by a Third part. At the bottom of which Pit, I was not Discourag'd to find my self so deep

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in the Earth, for considering I was yet above Three Thousand Miles from the *Center*, I thought my self but in a Well. It is built on all sides with *Firr*-Trees one laying upon another on Four sides from the bottom to the top.

They Work towards One, Two, or Three of the Clock, as they speak; for the *Miners* direct themselves under-ground by a *Compass*, not of Thirty Two Points, (such as is used at *Sea*,) but by one of Twenty Four, which they divide, as we do the Hours of the Day, into Twice Twelve.

Of the GOLD-Ore some is White, some Black, some of it Red, and some Yellow. That with Black Spots in White is esteem'd the best; as also the Ore which lyeth next to the Black Veins.

There have been Pieces of *Virgin* GOLD found in this *Mine*.

Where they Pound the GOLD-Ore, they lay a Foundation Three Yards deep of Wood, upon which

they place the Ore, over which there are Four and Twenty Beams, armed at the bottom with Iron, which break and grind the Ore, it being cover'd all the while with Water. These Beams are mov'd by Four Wheels, one Wheel to Six Beams, the Water which cometh out from the pounded Ore, is let into little Pits or Chests commonly Seven or Eight one after another; and afterwards into a large Pit of almost half an Acre of Ground, and then after setling let out.

The GOLD-Ore in Powder or Pounded is called *Slich*, of which that is the Richest which is nearest to the Beams where it is first Pounded. They Work thus Day and Night continually. The Candles which they make use of are of *Firre* or some Refinous Wood.

They wash the *Slich* so long, as perhaps in an Hundred Pound Weight, there may be half an Ounce, or an Ounce of GOLD and *Silver*, the greatest part ordinarily GOLD,

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Two Thirds generally. To this *Slich* they add *Limeſtone* and *Slacken*, and Melt them together in the Melting Furnace.

The firſt Melting produceth a Subſtance called *Lech*; this *Lech* they burn with *Charcole* to make it lighter, to open its Body and render it porous, and then it is called *Roſt*.

To the *Roſt* they add *Sand* as they ſee occaſion, and Melt it again in the Melting Furnace; then let it out into the Pan, and proceed as in the Melting of *Silver*. *BROWN's Trav. in* Hungaria *&c. Pag.* 98, *&c.*

The *Lord Bacon* commends the Wit of the *Chineſes*, who deſpair of Making of GOLD, but at the ſame time are mad upon the Making of SILVER: For certain it is, ſaith that Noble Philoſopher, that it is more difficult to make GOLD, (which is the moſt Ponderous and Materiate amongſt *Mettals*) of other *Mettals*, leſs Ponderous, and leſs Materiate; than

than (*Viâ Verſâ*) to make SILVER: of *Lead*, or *Quick-Silver*: Both which are more Ponderous than SILVER: So that *They* need rather a further Degree of *Fixation*, than any *Condenſation*. *BAC. Nat. Hiſt.*

The Polite and Ingenious *Dr. Sprat*, now Biſhop of *Rocheſter*, ſpeaking of the Modern *Chymiſts*, who ſearch after Riches, by *Tranſmutations*, and the great *Elixir*, ſaith, That their Succeſs has been as ſmall, as their Deſign was extravagant; and that their *Writers* involve them in ſuch Darkneſs, that *He* ſcarcely knows, which was the greateſt Task, to underſtand their meaning, or to Effect it. Theſe Men, *ſaith He*, are ſo earneſt in the Chaſe of the *Philoſopher's Stone*, that they are ſcarce capable of any other Thoughts: So that if an *Experiment* lye never ſo little out of their Road, it is free from their Diſcovery: As I have heard of ſome Creatures in *Africk*, which ſtill going a violent pace ſtraight on,

on; and not being able to turn themſelves, can never get any Prey, but what they meet juſt in their way. This *Secret* they proſecute ſo impetuouſly, that they believe they ſee ſome Footſteps of it, in every Line of *Moſes*, *Solomon*, or *Virgil*. The Truth is, they are downright *Enthuſiaſts* about it. And ſeeing we caſt *Enthuſiaſm* out of *Divinity* it ſelf, we ſhall hardly ſure be perſwaded, to admit it into *Philoſophy*. It were perhaps a vain attempt, to try to cure ſuch Men of their groundleſs Hopes. It may be they are happier now, as they are: And they would only cry out with the Man in *Horace*, that their Friends, who had reſtor'd them to a perfect Senſe, had Murther'd them. But certainly if theſe Men could be brought to content themſelves with moderate Things, to grow Rich by degrees, and not to imagine, they ſhall gain the *Indies*, out of every *Crucible*: There might be wonderful things expected from them.

them. *SPRAT's Hiſt. of the* ROYAL SOCIETY, *Pag.* 37, 38.

Dr. Hackwell, in his Apology of the Power and Providence of God, ſpeaking of the *Philoſopher's Stone,* ſaith, He much doubts whether any ſuch Experiment be yet really found or no; and if it be, whether the Operation of it be not more dangerous and difficult, then the effect ariſing from it, is or can be advantagious. But of this, *ſaith he,* I am well aſſur'd, that as he who digg'd in his *Vineyard* for GOLD miſs'd it, but by opening the Roots of his *Vines,* thereby found their Fruit, the next Year more worth unto him than GOLD: So whileſt Men have labour'd by Tranſmutation of *Mettals* from one *Species* to another to make GOLD, they have fallen upon the Diſtillations of Waters, Extractions of Oyles, and ſuch like rare Experiments unknown to the Ancients, which are undoubtedly more pretious for the uſe of Man, than all the GOLD of both the *Indies.*

Indies. HAKEWILL, *Lib.* 3. *Chap.* 9. *Sect.* 2.

Obſervations conſerning SILVLR.

SILVER is the moſt Perfect of all *Mettals* Except *Gold*, whereunto it comes ſo near, as to want nothing but the Colour; and therefore thoſe that moſt of all oppoſe the Opinion of the *Tranſmutation* of *Mettals* one into another, do yet hold it poſſible to turn SILVER into *Gold*, becauſe the Colour only being wanting, the Fire and Artificial Concoctions can ſupply that, whereof there be many Experiments: From the good Mixture and Fineneſs of its Parts, proceeds its induring the Fire with very little waſte, as alſo its being Tough and Malleable, and endures the drawing out into very Thin Leaves, and ſmall Wyre; if it were not a Common Trade to do it, it would not be believ'd to be poſſible, that

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an Ounce of SILVER ſhould be Drawn out into Fourteen Hundred Yards of Wyre; and it is yet more admirable, that all *that* ſhall be made Guilt Wyre, with only ſix Grains of *Gold*; So that although SILVER can be Extended to admiration, yet *Gold* is a Hundred times more *Ductile* than it. *BARBA of* Mettals, *Chap.* 27.

The Chief Places of the *Indies* from whence they draw SILVER, are *New Spain*, and *Peru*; but the *Mines* of *Peru*, ſaith *Acoſta*, far ſurpaſs the reſt; and amongſt all others of the World, thoſe of *Potozi*.

The greateſt Riches of the Kingdom of *Peru* is moſt out of ſight hid in the Bowels of the Earth, but found in thoſe never decaying *Mines* of GOLD and SILVER; more eminently abounding in this one Province, than in all *America*. For inſtance whereof we may take the SILVER *Mines* of *Potozi*, Diſcover'd in the Year 1545, the fifth of which Payable into the *King's Exchequer*,

Exchequer, amounted in Forty Years to one Hundred and Eleven Millions of *Pezoes*, every *Pezo* being Valued at Six Shillings and Six Pence; and yet a third part of the Whole was discharg'd of that Payment. By this one we may guess somewhat of the *rest*, as by the proportion of *one Member*, the Dimentions of the *Whole Body* may be probably geuss'd at; unless the Riches of these *Mines* be beyond conjecture of which it is affirm'd by some knowing Men, that they yield in many Places more *Gold* than *Earth. PET. HEYLIN.*

How these Rich Mines of *Potozi* came first to be discover'd since it was a thing somewhat Remarkable, I shall here give an account: The manner (therefore) of this Discovery was as followeth.

A *Peruvian* call'd *Gualpa*, who Work'd at the Mines of *Porco*, going a Hunting, it chanc'd that the Game ran up the steep Mountain of *Potosi*, which prevented his Pursuing

ſuing of it any further; but the Mountain being over grown with Trees, he got hold from one Bough to another to help himſelf up, and at laſt taking hold of the Bramble call'd *Quinua*, he pull'd the ſame out of the Ground, and finding it heavy, lookt upon it, and eſpy'd a great Lump of SILVER hanging at the Root of it; whereupon viewing the Hole, he diſcover'd a Rich SILVER Vein; of which taking ſome Pieces home, and Melting them, he found that it was the beſt SILVER that ever he had known; wherefore he privately got a greater quantity, and by degrees grew Extraordinary Rich: But tho he carried his deſign never ſo cloſe, yet he was at laſt ſuſpected, and eſpecially by his Neighbour *Guanca*, Born in the Valey *Xauxa*, who was the more jealous of him, becauſe he ſold greater Bars of SILVER than any were Caſt at *Porco*. Whereupon he reſolved to ſpeak to him, and getting out the Secret, it came to this

this Agreement between them, that they ſhould both be Partners, and ſhare the Booty; *Gualpa* was to keep the *Vein*, ſince call'd the *Rich Vein*. and *Guanca* was to have another, at Preſent Nam'd *Diego Centeno*: But they agreed not long; for *Guanca* finding much Labour upon his Vein, by reaſon of the hardneſs, and that he could get no ſhare in what *Gualpa* got, acquainted his *Spaniſh* Maſter *Vilaroel* with it, who reſted not till he had found out the truth thereof; for which *Valaroel* obtain'd (according to the Cuſtome of *Porco*) ſeveral Rods to work for him, only Paying the *King* one fifth Part of what he got, and ſo remain'd owner of the Mine *Centeno*.

This Diſcovery of the Rich Mine *Potozi*, is ſaid to have happen'd on the 24*th*. of *April*, 1545. Soon after which they found the SILVER Vein *Del Eſtanno*, which tho it was very Rich, was difficult to be digged, beauſe of its hardneſs. The firſt Vein which *Gualpa*, ſearch'd

after ſtood upright from the bottom of the *Mine*, and contain'd above Three Hundred Foot in Length, and Thirteen in Bredth, and continuing good for Two Hundred Foot in Depth, after which the SILVER begins to leſſen.

Theſe Mines produce Yearly for the *Kings* fifth Part, Forty Thouſand Pieces of SILVER, each valued at Thirteen *Ryals*, each *Ryal* being Four Shillings, beſides what he is defrauded of, which is perhaps half as much more. *OGILBY's America*, *pag.* 463.

For the more eaſie Working in the *Mines*, the *Spaniards* have digged *Trenches*, which they call *Socabones*, at the Foot of the Mountain of *Potozi*, towards the Weſt, croſs through the Mountain to the *Mine*, each of them being Eight Foot Broad and a Fathom Deep, and lock'd up with Gates, through which the SILVER is carried out, whereof the Owner of the *Socabon* receives a fifth Part. The *Socabon* which

which leads to the *Rich Vein*, was begun *Anno* 1556. and finiſh'd in Twenty-nine Years, Extending it ſelf Two Hundred and Fifty Rods in Length. The *Miners* work by Candle-Light, both Day and Night by turns; thoſe that Work in the Day, Sleep in the Night, and thoſe that Work in the Night, Sleep in the Day. The *Ore*, which is as hard as a Stone, is cut out with Pick-Axes, beaten in pieces with an Iron-Crow, and carried upon their Backs on Ladders made of Leather; Each Ladder hath three faſtnings about the thickneſs of a Cable, ſtretch'd out by Sticks, ſo that one goes up on one ſide, whileſt another comes down on the other. Each Ladder being Ten Fathom long, is pitch'd upon its ſeveral Floor on which the Labourers reſt before they go up higher, for they make divers Floors according to the Depth of the *Mine*. The Labourers carry the *Ore* in Bags faſtned before on their Breaſts, and falling back over

their Shoulders, three and three together, the foremoſt whereof ties a lighted Candle to his Thumb, and thus they help themſelves with both hands. It is a wonderful thing to Conſider, how the *Peruvians* are able to ſcramble up and down continually a Hundred and Fifty Fatham: But beſides many other Inconveniences, the *Mines* often fall in, or at leaſt great Pieces, which Bury all the Diggers. The *Mines* alſo being exceſſive Cold, occaſion to thoſe that are not us'd to them, a *Vertigo* in the Head, and Vomiting. The SILVER runs for the moſt part between two Rocks, as it were in a long Channel, of which one ſide is as hard as *Flint*, and the other much ſofter, The SILVER is of different Value; the beſt, call'd *Cacilla*, or *Tacana*, reſembles *Amber* in Colour; the worſer ſort is *Blackiſh*, and ſometimes of an *Aſh-Colour*. The Pieces of *Ore* are carried on the Backs of the Sheep *Pacos* to the Mill, where being ground

ground to Powder, they are put into *Furnaces* to melt; of which there were once above Six Thouſand on the Top of *Potozi*; but ſince the *Quick-Siviler* was found to cleanſe the ſame, not a third part remains. *Ibidem, Pag.* 464, 465.

SILVER is in its higheſt perfection in JAPAN, but not uſed in Trade; in which is ſeen nothing but *Gold*, and ſome ſmall Coin of *Braſs*; which latter they ſpoil by Refining it too much. *PHILOSOPH. TRANSACT. Numb.* 49. *Pag.* 984.

Obſervations concerning METTALS; *how they are generated.*

IT is no wonder, that Learned Men differ ſo much in their Opinions, about the Matter whereof METTALLS are engendred, becauſe the Author of Nature ſeems to have Created them in that ob-

ſcurity, and depth, and to have immur'd them with hard Rocks, on purpoſe, to hide their Cauſes, and to give check to the Ambiton of Man.

The Philoſophers, who pretend to know the Cauſes of Things, beſides the firſt Matter, (which is the firſt Principle, not only of *Mettalls*, but of all other *Bodies* in the World) aſſign another Matter remote alſo, which is a certain moiſt and unctuous Exhalation, together with a portion of thick and tough Earth, from which, being mingled together, there reſults a Matter, whereof not only *Mettalls*, but alſo *Stones* are made: For if dryneſs prevail, *Stones* are begotten, but if the unctuous humidity be predominant, then *Mettalls* are begotten; *Plato*, *Ariſtotle*, and their Followers are of this Opinion.

From the abundance of this pure, and Shining Moiſture, made Solid, proceeds the Luſtre of *Mettalls*, in whom, of all the Elements, *Water*

is

is experimentally known, to be moſt predominant, and therefore they run, and are diſſolv'd by Fire.

From the various temperament, and purity of the aforeſaid Matter, come the Divers Kinds of *Mettalls*, the moſt pure and fine of all which, and (as it would ſeem) *Nature's* Principal intention, is Gold.

Many, to avoid difficult diſputes of this Nature, do hold with the Vulgar; That at the Creation of the World, God Almighty made the Veins of *Mettalls* in the ſame Condition, as we now find them at this Day; herein doing *Nature* a great injury, by denying her (without Reaſon) a productive Virtue in this Matter, which is alow'd unto her in all other Sublunary Things: Moreover, that Experience in divers places hath manifeſted the contrary: A clear Example whereof we have in *Ilva*, an Iſland adjoyning to *Tuſcany*, full of *Iron* Mines, which when they have dug as hol-

low, and as deep as they can, the Circumjacent Earth falls in, and fills them up again; and in the ſpace of Ten or Fifteen Years at moſt, they work thoſe *Mines* again, and thence draw out abundance of *Mettall*, which that new Earth hath been converted into: Many do think that the ſame happens in the rich Hill of *Potoſi*. *BARBA of* Mettalls. *Chap.* 18.

It is Reported by ſome of the *Ancients*, that in *Cyprus*, there is a kind of *Iron*, that being cut into *little Pieces*, and put into the Ground, if it be well *Water'd*, will increaſe into greater Pieces. But this is certain, and known of Old, That *Lead* will multiply, and increaſe; as hath been ſeen in Old *Statua*'s of *Stone*, which have been put in *Cellars*; the *Feet* of them being bound with *Lead*; where (after ſome time) it appear'd, that the *Lead* did ſwell; inſomuch as it hang'd upon the *Stone* like *Warts*. *BACON*'s *Nat. Hiſt. Experim.* 797.

Our

Our *Salt-Petre* Men find, that when they have extracted *Salt-Petre* out of a Floor of Earth one Year, within Three or Four Years after, they find more *Salt-Petre* generated there, and do work it over again. The like is obſerv'd in *Allum* and *Copperas*.

And for *Mettalls*, our *Tinners* in *Cornwall* have experience of Pits which have been fill'd up with Earth, after they have wrought out all the *Tin* they could find in them, and within Thirty Years they have open'd them again, and found more *Tin* generated. The like hath been obſerved in *Iron*, as *Gaudencius Merula* reports of *Ilva*, an Iſland in the *Adriatick-Sea*, under the *Venetians*, where *Iron* breeds continually, as faſt as they can Work it; which is confirm'd alſo by *Agricola* and *Baccius*. The like we read of at *Saga* in *Lygiis*, where they dig over their *Iron Mines* every Tenth Year. *John Matheſius* gives us examples of almoſt all ſorts of

Minerals

Minerals and *Mettalls* which he had obſerv'd to grow and regenerate. The like examples you may find in *Leonardus Thurneſſerus Eraſtus* affirms, that he did ſee in St. *Joachims* Dale. *Silver* grown upon a Beam of *Wood*, which was placed in the Pit to ſupport the Works; and when it was rotten, the Workmen comming to ſet new Timber in the place, found the *Silver* ſticking to the Old Beam. Alſo *He reports*, that in *Germany* there hath been Unripe and Unconcocted *Silver* found in *Mines*; which the beſt Workmen affirm'd would become Perfect *Silver* in Thirty Years. The like *Modeſtinus Facluus*, and *Matheſius*, affirm of Unripe and Liquid *Silver*; which when the Workmen find, they uſe to ſay, *We are come too ſoon.* *JORDEN's Diſcourſe of Natural Baths, and Mineral Waters, Cap.* 11.

That *Mettalls* may be (and often have been) found in a Soft and Liquid Form or Subſtance, the Honourable

nourable Mr *Boyle* inſtances from *Gerhardus*, in theſe Words: *Item aqua cærulea inventa eſt Annebergæ ubi argentum adhuc erat in primo ente, quæ coagulata, redacta in calcem fixi & boni Argenti.* Alſo that at *Anneberg* a Blue Water was found, where *Silver* was yet in its firſt Being, which coagulated, was reduced into the Powder or Calx of fixed and good *Silver*. *BOYLE*'s *Scept. Chym.* pag. 360.

Obſervations concerning DAMPS *in Mines*

THE Learned and Ingenious *Dr. Plot*, ſpeaking of DAMPS in Coal-Mines, reduces them to either *Superterraneal*, or *Subterraneal*; both which ſorts, *He ſaith*, He takes to proceed from *Stagnations* in the *Subterraneal* Vaults of the Earth, for want of due Ventilations, and Commerce between the *Inferior* and *Superior* Air. The *Material* Cauſes,

Cauſes, ſaith the *Dr.* may be various, either Simple, or Compound: As the meer Corruption of the ſimple Air alone upon a long *Stagnation* in the *Coal*-Rooms, and the Rifts and Cliſts of the Rock of *Coal* it ſelf, may be its *Material* Cauſe indeed; but the *Cauſa ſine quâ non* of ſuch a *Damp*, he takes to be the want of motion in thoſe Cavities, without which, the *Air* would never have Corrupted; no more than *Water* which never Corrupts till it Stagnates, when indeed like the *Air* it becomes poyſonous, tho' poſſibly not to that Degree, the *Air* being a Body much finer, and convey'd to the more tender parts of the Body. Whence it is, that in the *Old Works*, wherein there has been no digging for a long time, no laveing, drawing, or pumping of Water, all which keep the *Air* in motion, and the *Water* from Cankering, theſe DAMPS are moſt frequent and moſt dangerous. Whence it is too, that the *Works* where

where the Bed of Coal is thin, and admits of but few or no ſuch Rifts or Cleſts for the *Air* to Stagnat or Corrupt in, are ſeldom or never troubled with them. Upon which account 'tis likewiſe, that tho' a Bed of Coal have many of theſe Rifts, and large Ones too; yet as long as there is a profluence of *Water* through them, there is no Danger of their Entertaining ſuch DAMPS; which as ſoon as made dry by a *Sough* or *Free-Level*, the ſame *Mine* ſhall become much more lyable to them; the wholeſome *Air* that was in them whilſt kept in motion by the *Flux* of the *Water* (having little or no Communication with that above Ground) now Stagnating and Corrupting to that Degree, that it not only extinguiſhes the glowing heat of Coals, and the Flame of Candles, Torches, &c. but the *Flammula Vitæ* too in moſt living Creatures, ſo that the *Animal* which reſpires it, ſometimes expires

expires with it too. *PLOT's Hiſt. of* Staffordſhire, *Pag.* 133. 134.

The Ingenious Mr. *Jeſſop*, of *Broomhall* in *Yorkſhire*, in a Letter to Mr. *Liſter*, acquaints him, that there are four ſorts of DAMPS common in thoſe parts.

The *Firſt* is the *Ordinary* Sort, which is known every where; the *External* Signs of its approach are the Candles burning Orbicular, and the Flames leſſening by degrees until it quite extinguiſh; the *Internal*, Shortneſs of Breath. Mr. *Jeſſop* ſays, He never heard of any great Inconvenience, which any one ſuffer'd by it, who eſcap'd Swooning. Thoſe that Swoon away, and eſcape an abſolute ſuffocation, are at their firſt Recovery tormented with violent Convulſions, the pain whereof, when they begin to recover their Senſes, cauſes them to Roar exceedingly. The ordinary Remedy is to dig a Hole in the Earth, and lay them on their Bellies, with their Mouths in it; if that

that fail, they Tun them full of good Ale; but if that fail, they conclude them in a deſperate Condition. Mr. *Jeſſop* ſays, He has known ſome, who have been Recover'd after this manner (when ſome of their Companions at the ſame time have died) that told him they found themſelves very well within a little time after they had recover'd their Senſes, and never after found themſelves the worſe for it.

They call the *Second* ſort the *Peaſe-bloom* DAMP, becauſe, as they ſay, it ſmells like *Peaſe-bloom.* They told Mr. *Jeſſop*, it always comes in the Summer time, and that thoſe *Groves* are not free, which are never troubled with any other ſort of DAMPS. *He* ſays, he never heard it was Mortal, the ſcent perhaps freeing them from the Danger of a Surprize: But by Reaſon of it, many good *Groves* lye idle at the beſt and moſt profitable time of the Year, when the

Subterraneous

Subterraneous Waters are at the loweſt. They fancy, it proceeds from the multitude of Red *Trifoil* Flowers, by them call'd *Honey-Suckles*, with which the Lime-Stone Meadows of the *Peak* (where they have this ſort of DAMP) do much abound.

Dr. Plot ſays, that he enquir'd concerning this *Sort* in the Eaſt part of *Staffordſhire*, where the *Moore-Lands* bound upon the *Peak-Country* of *Darbyſhire*, and found it not only there, but as far as he could learn, to be the moſt common DAMP in the Country, it making their Candles firſt to diminiſh, to burn round, and at length to go out, perfuming the *Stauls* at the ſame time with a faint Sweet ſmell, as thoſe in *Darbyſhire* do, only with this Difference, that theſe in *Staffordſhire* are ſaid to be ſometimes viſible, ſhewing like a *thin Smoak* which may be ſeen not only in the *Groves*, but fuming out at the top of the Pit. But in *Staffordſhire* (ſays

(ſays *Dr. Plot*) they are wiſer (where they go for their *Coal* Forty or Fifty Yards deep, and have no ſuch thing as *Trefoil*, for many Miles, and yet have this DAMP,) than to think it proceeds either from *Peaſe* or *Trefoil*; it being rather apprehended to ariſe from the Workmens Breath and Sweat, mixt with the Steams of the Golden *Marchaſite* or Braſs Lumps, than any thing elſe.

The *Third* ſort of DAMP is the ſtrangeſt, and moſt Peſtilential of any, if all be true which is ſaid concerning it. Thoſe who pretend to have ſeen it (for it is viſible) deſcribe it thus: In the higheſt part of the Roof of thoſe Paſſages, which Branch out from the main *Grove*, they often ſee a round thing hanging, about the bigneſs of a Foot-ball, cover'd with a Skin of the thickneſs and Colour of a *Cob-Web*: This, they ſay, if by any Accident, as the Splinter of a Stone, or the like, if it be broken, imme-

diately diſperſeth it ſelf, and Suffocates all the Company. Therefore to prevent Caſualties, as ſoon as ever they eſpie it, they ſay, they have a way, by the help of a Stick and a long Rope, of breaking it at a diſtance; which done, they purifie the place well by Fire, before they dare enter it again. Mr. *Jeſſop* ſays, He dares not avouch the Truth of this Story in all its Circumſtances; becauſe the Proof of it ſeems impoſſible, ſince they ſay, it kills all that are likely to bear Witneſs to all the Particulars: Neither dares He deny, but ſuch a thing may have been ſeen hanging on the Roof, ſince He has heard many affirm it. Perhaps the General Tradition they have amongſt them, hath made them aſcribe all Strange and Surprizing *Effects* unto this *Cauſe*. They are not without a Reaſon for it, which is not altogether irrational, if the Matter of Fact be true; for they ſay, the Steam which ariſes from their

their Bodies and the Candles, aſcends unto the higheſt part of the *Vault*, and there condenſeth, and in time hath a *Filme* grows round about it, and at length Corrupting becomes Peſtilential: Thus (ſaith Mr. *Jeſſop*) have I heard many of our *Under-Ground Philoſophers* Diſcourſe.

The *Fourth* which they alſo call a DAMP (although how properly, I will now not argue) is that *Vapour*, which being touch'd by their Candle, preſently takes Fire, and giving a Crack like a Gun, produceth the like Effects, or rather thoſe of Lightning. Hence it is commonly call'd the *Fulminating* DAMP. *PHILOS. TRANSACT. Numb.* 117. pag. 391, 392.

Mr. *Jeſſop*, in a Letter to the Ingenious Mr. *Oldenburg*, concerning a further Account of DAMPS, ſays, That DAMPS are moſt generally obſerv'd to come about the latter End of *May*, and to continue during the Heat of Summer, and in thoſe places, which have DAMPS

all the Year long, yet they obſerve them to be moſt violent at that Seaſon: And that *He* could meet with no other certain Rule for any *Periodical* returns, except this *Annual*; although it be certain they do often return in the ſame Summer.

He alſo ſaith, There are ſome DAMPS that will quite extinguiſh all thoſe Fires that are let down into them, be they never ſo many Succeſſively, or never ſo great; and Fire is obſerv'd to be ſo far from Curing, that it often creates DAMPS in places not otherwiſe Subject to them. Indeed they are a preſent Remedy, if you can ſo order them, as by their help to make a Circulation of the *Air* through the Infected place, otherwiſe they do hurt; and thoſe *Groves* wherein they are forced to break their Rocks by the help of great Fires, are ſeldom free from DAMPS. *PHILOS. TRANSACT. Numb.* 119. pag. 453, 454.

Mr.

Mr. *George Sinclar* ſays, That the *Fire* of *Fulminating* DAMP is in *Scotland*, in a Land call'd *Werdy*, Weſt of *Leith*; which they there from its Effects (that are very much like ours) are pleas'd to call *Wild-Fire*.

He ſays, that they do there prevent this DAMP by a Perſon that enters before the *Workmen*, who being cover'd with wet *Sackcloth*, when He comes near the *Coal-Wall*, where the *Fire* is fear'd, He creepeth on his Belly with a long Pole before him, having a lighted Candle on the top on't, with whoſe Flame the *Wild-Fire* meeting, it breaketh with violence, and running along the Roof, goeth out with a Noiſe at the Mouth of the *Sink*; the Perſon that gave Fire eſcaping by creeping on the Ground, and keeping his Face cloſe to it, till it be over paſt. *GEORGE SINCLAR's Miſcellan. Obſerv.* pag. 292, 293, 294.

Dr. Plot adviſes all ſuch as are to go down into any deep *Well*, that

may be ſuſpected to have any malignant, noxious Steams, or Vapours, firſt to throw down into them a Peck of good *Lime*, which ſlaking in the Water, and fuming out at the top, will ſo effectually diſpel all ſuch poiſonous Vapours, that they may ſafely go down, and ſtay ſome time unhurt. *PLOT's Nat. Hiſt. of* Oxfordſhire, *Pag.* 63.

Obſervations concerning the Generation *of* INSECTS.

THat Learned and Ingenious *Italian* Author, *Franciſco Redi*, in his Book Entituled, *Eſperienze intorno alla Generatione Degl' Inſetti*, with much Induſtry undertakes to evince, That there is no ſuch thing as *Æquivocal Generation*, but that every *Animal* is generated by the Seed of another *Animal*, (its Parent,) or, at leaſt, from ſome Living and un-corrupted Plant, as out of *Oak-Apples*, and ſeveral Protuberances

tuberances and Excreſcencies of Vegetables.

Firſt then, in the aſſerting of the *Univerſal* and true *Generation* of INSECTS by a peculiar and paternal Seed, this Author poſitively affirms, that He could never find, by all the Experiments and Obſervations he ever made, (of which he relateth a great Number, by himſelf made upon many ſorts of *Animals*) that ever any INSECTS were bred from Fleſh, or Fiſh, or putrified Plants, or any other Bodies, but ſuch, as *Flies* had acceſs unto, and ſcatter'd their Seed upon; He having taken extraordinary care and pains to obſerve, that always on the Fleſh, before it did *Verminate*, there ſate *Flies* of the ſelf ſame kind with thoſe that were afterwards produc'd thence; and again, that no *Worms* would ever come from any Fleſh in Veſſels well cover'd, and defended from the Acceſs of *Flies*; ſo that to him there ſeems no Generation of INSECTS from

any dead *Animals*, but such as have been *Fly-blown*.

And lest it should be objected, that the Reason, why in Vessels exactly clos'd, no INSECT breeds, is the Want of *Air*, necessary to all *Generation*, He hath carefully cover'd several Vessels with very fine *Naples-Vaile*, for the *Air* to enter, though *Flies* could not; but that no *Worms* at all were bred there, notwithstanding that many *Flies* swarm'd about them, invited by the smell of the Flesh inclosed therein.

Secondly, to make out the other part of his Position, *viz.* That those *Animals* that are not bred by the Seed of other *Animals*, are produc'd from some Live Plant, or its Excrescence; *This Author* thinks it not absurd to affirm, That that *Anima* or *Power*, which is able to produce Flowers and Fruits in Living Plants, may be alike capable to breed *Worms* in them; since that *Soul* is so powerful, as to cause Plants

Plants to feed, to grow and to produce Seed, as it doth in *Animals*. For Confirmation of which, He obſerveth, that both the Generation of *Worms* in *Vegetables* is always and conſtantly the ſame, (not at all caſual,) and that all *Galls* grow conſtantly in one determinate part of the Branches, and always in the new Branches; as alſo, that thoſe little *Galls*, which grow on the Leaves of the *Oak-Holm*, &c. do all grow conſtantly on the Fibres or Strings of thoſe Leaves, not one of them being ſeen to grow on the ſmooth part betwixt two Strings: Farther, that there are found many Leaves of other Trees, on which grow *Veſicles*, or ſmall Bags, or ſome wrinckled or ſwell'd places, full of *Worms*, ſpringing forth with thoſe Leaves. Beſides, that there is not one *Gall* but it hath its proper *Worm*; and that each ſort of *Galls* hath its peculiar and determinate Race of *Worms* and *Flies*, which never vary: Where

He

He takes notice of the Singular Art of Nature, both in forming the *Egg*, which is found in the Center of *Galls*, and in preparing its place therein, furniſhing it with many filaments, that paſs from the Gall-Apple to the Egg, as ſo many Veins and Arteries, ſerving for the formation of the *Egg* and *Worm*, and for the Nouriſhment requiſite thereto. To which He adds this Obſervation, that, there being certain ſorts of *Galls*, which breed more *Worms* at a time than One, *Nature* hath carefully provided and diſtinguiſh'd places for them, as ſhe doth in thoſe *Animals* that are multiparous.

Having Eſtabliſht this ground againſt *Equivocal Generation*, he proceeds to Particulars, and refutes the Opinion of thoſe, that will have *Bees* to be Bred of the Putrified Fleſh of *Bullocks*; *Waſps*, of *Aſſes* or *Mules* Fleſh; *Drones*, of Horſes; *Scorpions*, of buried *Crayfiſhes*, or the Herb *Baſilica*, or dead *Scorpions*; *Toads*, of *Ducks* Buried

in

in Dung; *Mites* of Cheeſe; affirming that none of theſe INSECTS have any ſuch *Origin* mentioned, but that all thoſe Subſtances have been firſt blown upon by ſome *Flie* or other.

See this Abſtract of Franciſco Redi's *Book of the Generation of INSECTS, in the PHLOSOPH. TRANSACT. Numb.* 57. *Pag.* 1175.

To that Opinion of the *Italian Franciſco Redi*, viz. *That ſome live Plants or their Excreſcencies do truly generate ſome INSECTS*, I told my Friend, as I Remember, that I indeed had obſerv'd, that the By-Fruits of ſome *Vegetables*, as of the *Oak* and *Wild-Roſe*, for Example, did grow up together with their reſpective *Worms* in them, from ſmall Beginnings to fair and large Fruit, ſome of them Emulating even the *Genuin Off-ſpring* of the Plant,

——*Et miratur non ſua poma.*

And

And further, that I did believe, the *Worms* were furnish'd with food in and from them; but not by any *Naval*-Connexion, as that Author fancies, and which I said, to me was unintelligible, and that I should be glad of a Notion, which might make out to me such a monstrous Relation, as *half Animal, half Vegetable*, or, which is all one, *Vegetable* Vessels inserted into an *Animal*, or, the Contrary. Strange *Oeconomy!*

That it had never been my good Fortune (what ever diligence I had us'd) to discern *Eggs* in the Center of *Galls*, but a *Worm* constantly, even at the very first appearance, as near at least as my Fortune led me. Yet I would not deny, but that diligence might one Day discover the *Egg* it self, which I was of Opinion was affixed to or near the Place by the Parent-INSECT, where the *Gall* rose.

That I ever found the *Worms* in all the *Excrescencies*, that I had

yet

yet met with, perfectly at liberty; and for the *Filaments*, *our Author* mentions, it was very possible he might be mistaken, it being very hard, and a matter not yet Treated of in any Publick Paper, *which* and *what* are the Vessels that enter into the Texture of a *Vegetable*, as of a large Tree, for Example, much more hard would it be to say, this is a Vessel in a small *Gall*.

That there were many By-Fruits of different Figure and shape (tho' perhaps of a like Texture) upon one and the same Plant, every one of which did Nourish and Produce a different Race of INSECTS; This, I told him, I thought might rather argue the divers Work-manship of different INSECTS, than one and the same Principle of *Vegetation* to be Author of several sorts of *Animals*. *MARTIN LISTER in a Letter to* Mr. Oldenburg; *which you may find in the PHILOS. TRANSACT. Numb.* 75.

I have

I have for my own Particular, beſides ſeveral of thoſe mention'd by the diligent *Goedartius*, obſerv'd divers other Circumſtances, perhaps, not much taken notice of, though very Common, which do indeed afford us a very Coercive Argument to admire the Goodneſs and Providence of the Infinitely Wiſe Creator, in his moſt Excellent Contrivances and Diſpenſations. I have obſerv'd at ſeveral times of the Summer, that many of the Leaves of divers Plants, have been ſpotted, or, as it were ſcabbed, and looking on the under-ſides of thoſe of them that have been but a little irregular, I have perceiv'd them to be ſprinkl'd with divers ſorts of little *Eggs*, which letting alone, I have found by degrees to grow bigger, and become little *Worms* with Legs, but ſtill to keep their former Places, and thoſe Places of the Leaves, of ther own accords, to be grown very Protuberant upwards, and very hollow, and arch'd underneath, whereby

whereby thoſe Young Creatures, are, as it were, ſhelter'd and hous'd from External Injury; divers Leaves I have obſerv'd to grow and ſwell ſo far, as at length perfectly to incloſe the *Animal*, which by other Obſervations I have made, I gueſs to contain it, and become, as it were a womb to it, ſo long till it be fit and prepar'd to be Tranſlated into another State, at which time, like (what they ſay of) *Vipers*, they gnaw their way through the Womb that bred them; divers of theſe kinds I have met with upon *Gooſberry* Leaves, *Roſe-Tree* Leaves, *Willow* Leaves, and many other kinds.

There are often to be found upon *Roſe-Trees* and *Brier Buſhes*, little red tufts, which are certain Knobs or Excreſcencies, growing out from the Rind, or Barks of thoſe kinds of Plants, they are cover'd with ſtrange kinds of threds or red hairs, which feel very ſoft, and look not unpleaſantly. In moſt of theſe, if it has no hole in it, you ſhall find certain

certain little *Worms*, which I suppose to be the causes of their Production; for when that *Worm* has eat its way through, they having perform'd what they were design'd by Nature to do, by degrees die and wither away.

Now, the manner of their Production, I suppose to be thus; that the All-Wise Creator has as well Implanted in every Creature a Faculty of knowing what Place is convenient for the Hatching, Nutrition, and preservation of their Eggs and Off-springs, whereby they are stimulated and directed to convenient Places, which become, as 'twere, the wombs that perform those Offices; as He has also suited and adapted a Property to those Places, whereby they grow and inclose those Seeds, and having inclosed them, provide a convenient Nourishment for them; but as soon as they have done the Office of a Womb, they die and wither.

The

The Progreſs of *Incloſure* I have often obſerv'd in Leaves, which, in thoſe Places where thoſe Seeds have been caſt, have by degrees ſwell'd and inclos'd them, ſo perfectly round, as not to leave any perceptible paſſage out.

From this ſame cauſe, I ſuppoſe that *Galls*, *Oak-Apples*, and ſeveral other Productions of that kind, upon the Branches and Leaves of Trees, have their Original; for if you open any of them, when almoſt Ripe, you ſhall find a little *Worm* in them.

Thus, if you open never ſo many dry *Galls*, you ſhall find either a hole whereby the *Worm* has eat its paſſage out, or if you find no paſſage, you may, by breaking or cutting the *Gall*, find in the middle of it a ſmall Cavity, and in it a ſmall body, which does plainly enough yet retain a ſhape, to manifeſt it once to have been a *Worm*, tho' it died by a too early ſeparation from the *Oak* on which it grew, its *Navel-String*, as

'twere, being broken off from the Leaf or Branch by which the *Globular* body that invelop'd it, receiv'd its Nouriſhment from the *Oak*. R. *HOOKE*'s Microg. *Pag.* 189, 190.

Perchance ſome kind of INSECT, in ſuch places where-there are *Putrifying* or *Fermenting* Bodies, may, by a *certain Inſtinct of Nature*, eject ſome ſort of *Seminal* principle, which Co-operating with various kinds of *Putrifying* Subſtances, may produce various kinds of INSECTS, or *Animate* Bodies: For we find in moſt ſorts of thoſe lower degrees of *Animate* Bodies, that the *Putrifying* Subſtances on which theſe Eggs, Seeds, or Seminal Principles are caſt by the INSECT, become as 'twere, the *Matrices* or Wombs that conduce very much to their *generation*, and may perchance alſo to their *variation* and *alteration*, much after the ſame manner, as by ſtrange and unnatural Copulations, ſeveral new kinds of *Animals* are produc'd, as *Mules*, and the like,

like, which are uſually call'd *Monſtrous*, becauſe a little unuſual, though many of them have all their principal parts as perfectly ſhap'd and adapted for their peculiar uſes, as any of the moſt perfect *Animals*. Is therefore the *Putrifying* Body, in which any kind of *Seminal* or *Vital* principle chances to be caſt, become ſomewhat more than meerly a Nurſing and Foſtering Helper, in the Generation and Production of any kind of *Animate* Body, the more near it approaches the true Nature of a *Womb*, the more Power will it have on the *Spirit-Blow* it incloſes. *HOOKE ibid.* pag. 123.

Obſervations concerning the ANT, *or* EMMET *or* PISMIRE.

THIS little *Animal* is the great Pattern of *Induſtry* and *Frugality*: To this School-maſter did *Soloman* ſend his Sluggard, who in thoſe Vertues not only excels all *Inſects*, but moſt *Men*. Other Excellent Obſervables there are in ſo ſmall a Fabrick: As the *Herculean* ſtrength of its Body, that it is able to carry its Triple Weight and Bulk: The Agility of its Limbs that it runs ſo ſwiftly: The equality of its Motion, that it trips ſo nimbly away without any ſalience or leaping, without any fits or ſtarts in its Progreſſion. Her Head is large and globular, with a Prominent Snout: Her Eye is of a very fair black Colour, round, globular and Prominent, of the bigneſs of a Pea, Foraminulous, and Latticed like that of other *Inſects*: Her mouth (in which you may ſee ſome

ſomething to move) is arm'd with a pair of Pincers, which move laterally, and are indented on the inſide like a *Saw*, by which ſhe bites, and better holds her Prey; and you may often ſee them carry their White Oblong Eggs in them for better Security. *HENR. POWER's Microſcop. Obſerv. Pag.* 25.

There have occur'd to my Obſervation but three ſorts of ANTS, commonly without Wings; *viz.* very *Black*; *Dark Brown*; and the Third ſort of near the Colour uſually call'd *Philemort*.

Each kind inhabit by themſelves in their ſeveral Banks; Two ſorts ſeldom or never being found together; and if either of the other Two ſorts be put into the *Black* ANTS Bank, 'tis worth obſerving what enmity there is betwixt theſe little Creatures, and with what violence the *Black* ones will ſeize on the *Red*, never leaving to pinch them on the Head with their *Forceps* or *Claws*, till they have kill'd

them upon the Place: Which done, they will carry them dead out of the Field, from their Bank. But if you put *Black* ANTS into a Bank of the *Red*, the *Black* ſeem to be ſo ſenſible of the ſtrangeneſs of the Place they are in, that there they will not meddle with the *Red*, but as if they were Frighted, and concern'd for nothing but ſelf-preſervation, run away.

Upon opening of theſe Banks, I obſerve firſt a *White Subſtance*, which to the bare Eye looks like the ſcatterings of fine White Sugar, or Salt, but very ſoft and tender; and if you take a bit of it, as big perhaps as a *Muſtard Seed*, and lay it on the Object Plate of a good *Microſcope*, you may by opening it with the Point of a Needle, diſcern many pure, White and Clear Appearances in diſtinct Membrans, all figur'd like the leſſer ſort of Birds Eggs, and as clear as a Fiſhes *Bladder*. This ſame Subſtance, as it hath been juſt now deſcrib'd, I find in

the ANTS themſelves, which I take to be the true ANTS Eggs; it being obvious to Obſervation that where ever this is uncover'd, they make it their buſineſs to carry it away in their Mouths to ſecure it, and will, after you have ſcatter'd it, lay it on a heap again, with what ſpeed they can.

I Obſerve they lie in multitudes upon this (if I may ſo call it) *Spawn* of theirs; and after a little time, every one of theſe ſmall adherances is turn'd into a little *Vermicle*, as ſmall as a *Mite*, hardly diſcern'd to ſtir; but after a few days more, you may perceive a feeble Motion of Flexion, and Extention, and they begin to look Yellowiſh and Hairy, ſhaped very like a ſmall *Maggot*; and ſo keeping that Shape, grow almoſt as big as an ANT, and have every one a black ſpot on them.

Then they get a *Film* over them, whitiſh, and of an *Oval* ſhape, for which reaſon I ſuppoſe they are

commonly call'd ANTS *Eggs*, which yet (to ſpeak properly they) are not.

I have, to prevent miſtakes, open'd many of theſe vulgarly call'd ANTS *Eggs*, I mean, the leſſer ſort, (for there are ſome as big as a *Wheat-Corn*, others leſs than a *Rye-Corn*) and in *Some* I find only a *Maggot*, to appearance, juſt ſuch as was deſcrib'd before: In *Others*, I find a *Maggot* beginning to put on the Shape of an ANT about the Head, with Two little Yellow Specks where the Eyes are deſign'd: In *Others*, a further progreſs, and furniſht with every thing to compleat the Shape of an ANT, but wholly tranſparent, the Eyes only excepted, which are then as black as black Bugles.

But when they have newly put on this Shape, I could never diſcern the leaſt Motion in any one part of the little Creature, whereof the Reaſon may perhaps be, the weakneſs of their Fibres; for after a little

tle more time, when they begin to be Brownish, they have ſtrength to ſtir all their parts.

At laſt I met with ſome of theſe reputed *Eggs*, which being carefully open'd by me, I took out ſeveral of them, every way perfect and compleat ANTS, which did immediately creep about among the reſt, no way differing from many other ANTS, but by a more feeble motion of their Limbs. And this I took for a clear Demonſtration of what I deſign'd, which was to know, That the *Film* does only cover the *Maggot*, while ſhe is transforming into an ANT, and fit to ſhift for her ſelf.

The *Black Speck* that is at one end of every ſuch reputed ANTS *Egg*, I ſuppoſe to be caſt out of the *Maggot*, in her transformation; ſince, after it puts on the Shape of an ANT, the *Speck* is quite gone, and the whole Body of the ANT pure clear; ſince alſo this *Speck* at the end of the ſaid *Egg*, lies always cloſe

cloſe to the *Anus* of the included ANT.

As to their care for their *Young*, (by which I mean, all the Sorts and Degrees aforeſaid, from the *Spawn* to the vulgarly call'd *Eggs*, in every one of which you'l find a Young ANT,) it is obſervable, how upon the breaking up of their Banks, they make it their buſineſs immediately to carry their Young out of ſight again, laying the ſeveral ſorts of them in ſeveral places and heaps: The which if you mingle again or ſcatter, you ſhall, laying but ſome bits of *Slate*, or the like, in any place they may come to and get under, after a few Hours ſee all the *Vermicles*, and vulgarly call'd *Eggs*, laid in their ſeveral and diſtinct parcels, under ſuch pieces of *Slate*, *&c.* provided the place be not ſo cold as to chill their Limbs; which if it be, by being brought to the Fire they will ſoon recover their ſtrength, and fall

fall to their buſineſs again, of ſecuring their *little Ones.*

I have obſerv'd in Summer, That in the Morning they bring up thoſe of their *Young* (that are vulgarly call'd ANTS *Eggs*) towards the top of their Bank; ſo that you may from Ten in the Morning, until Five or Six in the Afternoon, find them near the top; eſpecially about One, Two, or Three of the Clock, and later, if the Weather be hot, when for the moſt part they are found on the *South-Side* of the Bank: That towards Seven or Eight at Night, if it be Cool, or likely to Rain, you may dig a Foot deep before you can find them. *EDMUND KING*, M. D. *his Obſerv. concerning Emmits or ANTS.* Which you may find in the *PHILOS. TRANSACT. Numb.* 23. *Pag.* 425, 426, 427.

The next of theſe moving little Animals, are ANTS or PISMIRES, and thoſe are but of a ſmall Size, but great in Induſtry; and that which

which gives them means to attain to their Ends, is, they have all *One Soul.* If I ſhould ſay, they are *here* or *there*, I ſhould do them wrong; for they are *every where*, under Ground, where any hollow or looſe Earth is, amongſt the Roots of Trees, upon the Bodies, Branches, Leaves, and Fruit of all Trees, in all places, without the Houſes and within, upon the Sides, Walls, Windows, and Roofs without; and on the Floors, Side-Walls, Cielings, and Windows within, Tables, Cup-Boards, Beds, Stools, all are cover'd with them, ſo that they are a kind of *Ubiquitaries.* The *Cock-roaches* are their Mortal Enemies, and tho' they are not able to do them any Miſchief, being Living, (by Reaſon they are far ſtronger, and mightier than a Hundred of them, and if they ſhould force any One of them with Multitudes, he has the liberty of his Wings to make his eſcape) yet, when they find him dead, they will divide him amongſt

mongſt them into *Atoms*; and to that purpoſe, they carry him home to their Houſes or Neſts. We ſometimes kill a *Cockroach*, and throw him on the Ground, and Mark what they will do with him; his Body is bigger than a Hundred of them, and yet they will find the Means to take hold of him, and lift him up; and having him above Ground, away they carry him, and ſome go by as ready *Aſſiſtants*, if any be weary; and ſome are the *Officers* that lead and ſhew the way to the Hole into which he muſt paſs; and if the *Van-Couriers* perceive, that the Body of the *Cockroach* lies croſs, and will not paſs through the Hole, or Arch, through which they mean to carry him, Order is given, and the Body turn'd Endwiſe, and this done a Foot before they come to the Hole, and that without any ſtop or ſtay, and this is Obſervable, that they never pull contrary ways.

Thoſe

Thoſe that are Curious, and will prevent their coming on their Tables, Cupboards, or Beds, have little Hollows of Timber, fill'd with Water, for the Feet of theſe to ſtand in; but all this will not ſerve their turn; for they will ſome of them go up to the Cieling, and let themſelves fall upon the Teaſters of the Beds, Cupboards, and Tables.

To prevent them from coming on our Shelves where our Meat is kept, we hang them to the Roof by Ropes, and Tarr thoſe Ropes, and the Roofs over them, as alſo the Strings of our *Hamocks*, for which Reaſon we avoid them better in *Hamocks* than in Beds.

Sometimes when we try Concluſions upon them, we take the Carpet off the Table, and ſhake it, ſo that all the ANTS drop off, and rub down the Legs and Feet of thoſe Tables, (which ſtood not in Water,) and having done ſo, we lay on the Carpet again, and ſet upon

upon it a Sallet-Diſh, or Trencher, with *Sugar* in it, which ſome of them in the Room will preſently ſmell, and make towards it as faſt as they can, which is a long journy, for he muſt begin at the Foot of the Table, and come as high as the inſide of the Carpet, and ſo go down to the bottom and up of the outſide of the Carpet, before he gets on the Table, and then to the *Sugar*, which he ſmells to; and having found it, returns again the ſame way, without taking any for his pains, and informs all his Friends of this Booty; who come in Thouſands, and Ten Thouſands, and in an inſtant, fetch it all away; and when they are thickeſt upon the Table, clap a large Book (or any thing fit for that purpoſe) upon them, ſo hard as to kill all that are under it, and when you have done ſo, take away the Book, and leave them to themſelves, but a Quarter of an Hour, and when you come again, you ſhall find all theſe Bodies

dies carried away. Other Tryals we make of their Ingenuity, as this. Take a Pewter Diſh, and fill it half full of Water, into which put a little Gally-Pot fill'd with *Sugar*, and the ANTS will preſently find it, and come upon the Table; but when they perceive it Environ'd with Water, they try about the brims of the Diſh, where the Gally-Pot is neareſt, and there the moſt venturous amongſt them, commits himſelf to the Water, tho' he be conſcious how ill a Swimmer he is, and is drown'd in the Adventure: The next is not warn'd by his Example, but ventures too; and is alike drown'd, and many more, ſo that there is a ſmall Foundation of their Bodies to venture on; and then they come faſter than ever, and ſo make a Bridge of their own Bodies, for their Friends to paſs on; neglecting their Lives for the good of the Publick; for before they make an End, they will make way for the reſt, and become Maſters

ſters of the Prize. I had a little White Sugar which I deſir'd to keep from them, and was deviſing which way to do it, and I knockt a Nail in the Beam of the Room, and faſtned to it a brown Thread, at the lower end of which Thread, I tied a large Shell of a Fiſh, which being hollow, I put the Sugar in, and lockt the Door, thinking it ſafe; but when I return'd, I found three Quarters of my Sugar gone, and the ANTS in abundance, *aſcending* and *deſcending*, like the *Angels* on *Jacob*'s Ladder, as I have ſeen it Painted, ſo that I found no place ſafe, from theſe more than buſie Creatures.

Another ſort of ANTS there are, but nothing ſo numerous or harmful as the other, but larger by far; Theſe build great Neſts, as big as *Bee-Hives*, againſt a Wall, or a Tree, of Clay and Lome, ſometimes within Doors, and in it ſeveral little Manſions, ſuch as *Bees* make for themſelves, but nothing ſo cu-

rious; Theſe the *Cockroaches* and *Lizzards* meet withal, way-laying them near their Neſts, and feed upon them: which to prevent, they make from thence many and ſeveral Galleries, that reach ſome of them Six or Seven Yards ſeveral ways, of the ſame Earth they do their Neſts: So that for ſuch a diſtance as that, they are not to be perceiv'd, by any of their Enemies, and commonly their *Avenues* go out amongſt Leaves, or Moſs, or ſome other Covert, that they may not be perceiv'd: But the moſt of Theſe are in the Woods; for we have deſtroy'd their Neſts, and their Galleries within Doors ſo often, as they are weary of Building, and ſo quit the Houſe: I can ſay nothing of Theſe, but that they are the quickeſt at their Work of Building, of any little Creatures that ever I ſaw. *LIGON's Hiſt. of* Barbadoes, *Pag.* 63, 64.

Mr. *John Ray* obſerves, that the *Liquor* which ANTS ſometimes let fall

fall from their Mouths, dropping upon the Blue Flowers of *Cichory*, immediately gives them a large Red Stain; and ſuppoſeth, it would produce the like in other Blue Flowers.

Mr. *Samuel Fiſher* ſaith, that not only the *Juice*, but alſo the *Diſtill'd Water* or *Spirit* of this *Inſect* will produce the ſame Effect.

Mr. *Ray* ſays, That the ſaid Mr. *Fiſher* had ſome Years ſince acquainted him with this Experiment, *viz.* That if with a Staff, or other Inſtrument, you ſtir an heap of ANTS, (eſpecially *Horſe*-ANTS) ſo as to anger them, they will let fall thereon a *Liquor*, which if you preſently ſmell to, will twinge the Noſe like newly Diſtill'd *Spirit of Vitriol*. *PHILOS. TRANSACT. Numb.* 68.

'Tis a Thing well known, that ANTS, if they get into Peoples Clothes, and ſo to their Skin, will cauſe a ſmart and tingling, as if they were Nettled: which, ſaith

Mr. *Ray*, I conceive is done by letting fall the fore-mentioned *Corrosive Liquor*, rather than by *Stinging*. *PHILOS. TRANSACT. Ibid.*

The Liquor of ANTS is commended by *Schroder* for a most Excellent *Ophthalmick*.

Mr. *Evelyn* in that most Incomparable and Useful Discourse of *Forest-Trees*, saith, That PISMIRES may be destroy'd with Scalding Water, and disturbing their *Hills*, or rubbing the *Stem* with *Cow-Dung*, or a decoction of *Tithy-Male*, washing the infested parts; this, saith *He*, will insinuate, and chase them quite out of the *Chinks* and *Crevises*, without prejudice to the *Tree*, and is a good prevention of other *Infirmities*: They are also to be destroy'd by laying *Soot*, *Saw-Dust*, or refuse *Tobacco*, where they haunt, *Chap. XXVII. Sect.* 19.

Observa-

Observations concerning BEES.

THE Eye of a BEE is of a protuberant Oval Figure, black and all foraminulous, drill'd full of innumerable Holes like a Grater or Thimble; and, which is more wonderful, we could plainly see, that the Holes were all of a square Figure like an Honey-Comb, and stuck full of small Hairs (like the *Pores* in our Skin) and which (by blowing upon) you might see waft to and fro; All which neat particularities were more palpably discover'd in the Eye of a great HUMBLE-BEE. Now these Holes were not absolute perforations, but only dimples in their Crustaceous *Tunica Cornea*; which it seems is full of little Pit-Holes, like the Cap of a Thimble: For we cut out the Eye in a large HUMBLE-BEE and *Crecket*, and bared the *Shell* or *Horney-Coat* of the Eye; and laying either the *Convex* or *Concave* side

upwards (upon the Object Plate) I could eaſily perceive the little Holes or Dimples formerly menti-on'd. So that, by the favour of our *Microſcope*, I have ſeen more in One Hour, than that Famous BEE-Maſter *Ariſtomachus* did in his Fifty Years Contemplation of thoſe *Laborious Inſects*.

If you divide the BEE (or HUM-BLE-BEE eſpecially) near the Neck, you ſhall, without help of the *Glaſs*, ſee the Heart beat moſt lively, which is a White Pulſing Veſicle.

The *Stings* in all BEES are hol-low and tubulous (like a *Shoomaker's-Punch*) ſo that when they prick the Fleſh, they do alſo, through that Channel, transfuſe the Poy-ſon into it: For if you take a BEE, Waſp, or HUMBLE-BEE eſpecially, and gently ſqueeze her Tail, ſo that you may ſee the *Sting*, you ſhall perceive a drop of *Diaphanous* Liquor at the very end of it, which if you wipe off, you ſhall diſtinctly ſee it renew'd again,

that

that Humour paſſing down the Cavity into the end thereof. *POWER's Microſcop. Obſerv.* pag. 3, 4.

The *Sting* of a BEE ſeems to be a Weapon of Offence, and is as great an inſtance, that *Nature* did really intend *Revenge* as any, and that *Firſt*, becauſe there ſeems to be no other uſe of it. *Secondly*, by Reaſon of its admirable ſhape, ſeeming to be purpoſely ſhap'd for that very end. *Thirdly*, from the Virulency of the Liquor it ejects, and the ſad Effects and Symptoms that follow it.

But whatever be the Uſe of it, certain it is, that the Structure of it is very admirable; what it appears to the Naked Eye, I need not deſcribe, the Thing being known almoſt to every One; but it appears through the *Microſcope*, to conſiſt of Two parts, the One a *Sheath*, without a Chape or top, ſhap'd almoſt like the *Holſter* of a *Piſtol*; this *Sheath* I could moſt plainly perceive to be hollow, and to contain in it, both a *Sword* or

Dart, and the Poyſonous Liquor that cauſes the Pain. The *Sheath* or Caſe ſeem'd to have ſeveral Joynts or Settings together, it was arm'd moreover near the top, with ſeveral Crooks or Forks on one ſide, and on the other, each of which ſeem'd like ſo many *Thorns* growing on a *Briar*, or rather like ſo many *Cat's Claws*; for the Crooks themſelves ſeem'd to be little ſharp tranſparent Points or Claws, growing out of little *Protuberancies* on the ſide of the *Sheath*; and from ſeveral particulars, I ſuppoſe the Animal has a power of diſplaying them, and ſhutting them in again, as it pleaſes, as a *Cat* does its *Claws*, or as an *Adder* or *Viper* can its *Teeth* or *Fangs*.

The other part of the *Sting* was the *Sword*, as I may ſo call it, which is *Sheath'd*, as it were, in it; the top of which appears quite through at the ſmaller end, juſt as if the Chape of the *Sheath* of a *Sword* were loſt, and the end of it

it appear'd beyond the Scabbard; the end of this *Dart* was very ſharp, and it was arm'd likewiſe with the like *Tenterhooks* or Claws with thoſe of the *Sheath*: Theſe *Crooks*, I am very apt to think, can be clos'd up alſo, or laid flat to the ſides of the *Sword* when it is drawn into the Scabbard, as I have ſeveral times obſerv'd it to be, and can be ſpread again, or extended, when-ever the Animal pleaſes.

The Conſideration of which very pretty Structure, has hinted to me, that certainly the Uſe of theſe *Claws* ſeems to be very Conſiderable, as to the Main end of this Inſtrument, for the drawing in, and holding the *Sting* in the Fleſh; for the point being very ſharp, the top of the *Sting* or Dagger is very eaſily thruſt into an Animal's Body, which being once entred, the BEE, by endeavouring to pull it into the *Sheath*, draws (by Reaſon of the Crooks which lay hold of the Skin on either ſide) the top of the

Sheath

Sheath into the Skin after it, and the Crooks being entred, when the BEE endeavours to thruſt out the top of the *Sting* out of the *Sheath* again, they lay hold of the Skin on either ſide, and ſo not only keep the *Sheath* from ſliding back, but helps the top inwards, and thus, by an alternate and ſucceſſive retracting and emitting of the *Sting* in and out of the *Sheath*, the little enrag'd Creature by degrees makes his revengful Weapon pierce the toughest and thickeſt Hides of his Enemies, in ſo much that ſome few of theſe ſtout and reſolute Soldiers with theſe little Engines, do often put to flight a huge Maſty *Bear*, one of their deadly Enemies, and thereby ſhew the World, how much more conſiderable in War a few skilful Engineers, and reſolute Souldiers politickly order'd, that know how to manage ſuch Engines, are, than a vaſt unweildy rude force, that confides in, and Acts only by, its ſtrength. But (to proceed)

ceed) that he thus gets in his *Sting* into the Skin, I conjecture, becauſe, when I have obſerv'd this Creature living, I have found it to move the *Sting* thus, to and fro, and thereby alſo, perhaps, does as 'twere, pump or force out the Poyſonous Liquor, and make it hang at the end of the *Sheath* in a drop. The *Crooks*, I ſuppoſe alſo, to be the cauſe why theſe angry Creatures, haſtily removing themſelves from their Revenge, do often leave theſe Weapons behind them, *Sheath'd*, as 'twere in the Fleſh, and, by that Means, cauſe the painful Symptoms to be greater, and more laſting, which are very probably caus'd, partly by the piercing and tearing of the Skin, by the *Sting*, but chiefly by the *Corroſive* and *Poyſonous* Liquor that is by this *Syringe-Pipe* convey'd among the *Senſitive Parts*, and thereby more eaſily gnaws and corrodes thoſe tender *Fibres*. *HOOK*'s Microg. *Pag.* 163, 164.

Thoſe

Thoſe Two Learned and Ingenious Perſons, *Dr. Edmund King*, and *Mr. Francis Willoughby*, give an account of a ſort of Wild BEE, which breeds in the Stocks of old *Willows*. Curious to Obſerve. They firſt bore a *Canale* in the Stock, which, for more Warmth, they Furniſh afterwards with *Hangings*, made of *Roſe-leaves*, ſo roll'd up, as to be Contiguous round about to the ſides of the *Canale*. And to finiſh their Work, they divide the whole into ſeveral Rooms or Neſts, with round Pieces of the ſame leaves. *See this more at large, in the PHILOSOPH. TRANSACT. Numb. 65.*

The under or hinder Wings of a BEE, are the leaſt; that they may not incommode his flight. In Windy Weather, BEES often hold a little Stone in their hinder Feet; which ſerves as a balaſt to make them Sail through the Air more Steadily. *MOUF. De INSECT. Cap. 1.*

The

The *Humming* of BEES, is an *unequal Buzzing*; and is conceiv'd by ſome of the Ancients, not to come forth at their Mouth, but to be an *Inward Sound:* But it may be, it is neither; but from the motion of their Wings; for, it is not heard but when they Stir. *BACON's Nat. Hiſt.*

Sugar hath put down the uſe of *Honey*; inſomuch as we have loſt thoſe *Obſervations*, and *Preparations* of *Honey*, which the *Antients* had, when it was more valu'd. *Firſt*, it ſeemeth that there was in Old Time, *Tree-Honey*, as well as BEE-*Honey*; which was the *Tear* or *Blood* iſſuing from the *Tree*: Inſomuch as one of the *Ancients* relateth, that in *Tribeſond* there was *Honey* iſſuing from the *Box-Trees*, which made Men mad. Again, in *Ancient* Time, there was a kind of *Honey*, which either of its own Nature, or by art, would grow as Hard as *Sugar*; And was not

not ſo Luſhious as ours. *IDEM Ibid.*

The *Honey-Bag*, is the Stomach, which they always fill to Satisfie, and to ſpare; Vomiting up the greater part of the *Honey*, to be kept againſt *Winter*.

The Hiſtory of BEES, is the beſt that *Ariſtotle* hath given us, of any one *Animal*. Of their Polity, Generation, Conſervation, Diſeaſes, and Uſe: See alſo *Mouſet*, *Butler*, and a late *Treatiſe* of *Mr. Ruſden*. All that Authors ſpeak of the *Spontaneous* Generation of BEES, is Fabulous. The Aſhes of BEES are put into moſt Compoſitions for Breeding of *Hair*. *GREW's Muſ. REG. SOC. Pag.* 155.

Obſer-

Obſervations concerning the GLO-WORM.

HER Eyes (which are Two ſmall black Points or Specks of *Jett*) are Pent-hous'd under the broad Flat Cap or Plate which covers her head; which obſcure Situation, together with their exceeding exiguity, make them undiſcernable to common Spectators. Yet in the *Microſcope* they appear very fair, like black Poliſh'd *Jett* or *Marble*, Semi-globular, and all foraminulous, or full of ſmall but very curious Perforations, (as in common Flies.) Her two *Horns* are all joynted and degreed like the ſtops in the Germination of ſome Plants, as *Horſe-tail* and *Canes:* Under which ſhe hath two other ſmall *Horns* or *Pointers*, of the ſame Stuff and faſhion. If you take hold of her *Horns*, you may draw out her Eys, and cut them out, and ſo lay them

them on your Object Plate and ſee them diſtinctly.

This is that *Night-Animal* with its Lanthorn in its Tail; that creeping Star that ſeems to out ſhine thoſe of the *Firmament*, and to outvye them too in this property eſpecially; that whereas the *Celeſtial-Lights* are quite obſcur'd by the Interpoſition of a ſmall Cloud, this *Terreſtrial-Star* is more Enliven'd and Enkindl'd thereby, whoſe pleaſant fulgour no Darkneſs is able to Eclipſe. *POWER's Microſcop. Obſerv. Pag.* 23, 24.

The Nature of the GLOWORM is hitherto not well Obſerv'd. Thus much we ſee, that they breed chiefly in the hoteſt Months of *Summer*; And that they breed not in the open Air, but in Buſhes and Hedges. Whereby it may be conceiv'd, that the *Spirit* of them is very fine, and not to be refin'd, but by *Summers Heats*: And again, that by reaſon of the Fineneſs it doth eaſily exhale. In *Italy*, and the *Hotter Countries*, there

there is a *Flie* they call *Lucciole*, that *Shineth* as the GLO-WORM does; and it may be is the *Flying* GLO-WORM. But that *Flie* is chiefly upon *Fens* and *Mariſhes*. But yet the Two former *Obſervations* hold; for they are not ſeen, but in the *Heat* of *Summer*; and *Sedge* or other *Green* of the *Fens*, give as good Shade, as *Buſhes*. It may be the GLO-WORMS of the *Cold Countries* Ripen not ſo far as to be Wing'd. *BACON's Nat. Hiſt.*

The FLYING GLO-WORMS are in *Italy* every where to be ſeen in *Summer* Time. Theſe *Flying* or *Winged* GLO-WORMS are nothing elſe but the *Males* of the Common Creeping or Unwing'd GLO-WORMS. *Fabius Columna*, relates, that *Carolus Vintimiglia* of *Palermo* in *Sicily*, having out of Curioſity kept many Unwinged GLO-WORMS in a Glaſs, did put in among them a *Flying* one, which preſently in his Sight did Couple

with them one by one, after the manner of *Silk-Worms*; and that the next day the *Unwinged* ones, or *Females*, began to lay their Eggs. That the *Males* are alſo Flying Inſects in *England*, though they do but rarely or not at all *ſhine* with us, we are aſſured by an Eye Witneſs; who ſaw them in Conjunction with the Common *ſhining Unwinged* GLO-WORMS. Here by the way it may not be amiſs to impart to the *Reader* a diſcovery made by a certain Gentleman, and Communicated to me by *Francis Jeſſop* Eſq; which is, that thoſe reputed *Meteors* called in Latine *Ignes Fatui*, and known in *England* by the Conceited Names of *Jack with a Lanthorn*, and *Will with a Wiſp*, are nothing elſe but ſwarms of theſe Flying GLO-WORMS. Which if true, we may give an eaſie account of thoſe ſtrange *Phænomena* of theſe ſuppoſed Fires, *viz.* their ſudden Motion from Place to Place, and leading Travellers that follow them into

into Bogs and Precipices. *JOH. RAI's Obſervat. Topograph. Pag.* 409. 410.

The *Cicindela Volans*, or *Flying* GLO-WORM, tho it hath been pretty well deſcrib'd by ſeveral Writers that treat of *Inſects*, yet I think has been by none mention'd to be found in *England*, and indeed it is very rare, but I have happen'd to catch twice of them at *Northaw* in *Hertford-ſhire*; Firſt about Midſummer 1680, and for a Fortnight in *June* 1684. they flew about the Candle as ſoon as it grew Dark; at both which times the Weather was very *Hot*, and it may be it *Shines* only at ſuch Seaſons, tho the *Animal* be eaſie enough to be met withall Winged when it *ſhines* not, and without Wings *ſhining*, which is the Common GLO-WORM.

Aldrovandus affirms, *Ovis quæ parit Cicindela, Erucam quandam fieri, & ex hac tandem alatam gigni*, &c. It is much to the ſame purpoſe

deſcrib'd by *Mouſet* and *Thomas Bartholin* in his Treatiſe *De luce Animaliuns*: Save that they both, I think, miſtake in allowing the *Male* only to have Wings, whereas they both flie alike, as we may conclude was known to *Julius Scaliger*, *Exercit.* 191, from a Place it ſeems not regarded, tho Cited by *Mouſet*, where he ſays, *Cicindelam Volantem cum ſuo Mari in Coitu deprehendi*, &c. The ſame which happened to me, for I once caught the *Male* and *Female* Coupl'd, and could Obſerve no difference between them, except in Size, the *Female* being a little the larger, for they both *ſhined* alike. Its Light was very Vivid, ſo as to be ſeen plainly when a Candle was in the Room, but the Vibrations thereof were unequal, and the Colour Greeniſh, like that of the Creeping GLOWORM. The *Luminous* Part was two ſmall Specks on the under ſide of the Tail at its end. The *ſhining* continued for a little while after

after the Tail was cut off, tho it ſenſibly decay'd, till at laſt it went quite out. Whether it *ſhined* longer than the life remain'd in that Part (which will live for a Conſiderable time in all *Inſects*, after it has been ſever'd from the Body,) I much doubt; and *Mouſet* ſays, *Clariſſimum iſtum Splendorem unà cum Spiritu Vitali prorſus evaneſcere.* Poſſibly the uſe of this Light is to be a Lantern to the *Inſect* in catching its Prey, and to direct its Courſe by in the Night, which is made probable, by the Poſition of it on the under Part of the Tail, ſo that by bending the ſame downward (as I always obſerv'd it to do,) it gives a light forward upon the Prey or Object: The Luminous Rayes in the mean time not being at all incommodious to its ſight, as they would have been, if this *Torch* had been carried before it. This Conjecture is alſo favour'd by the placing of the Eyes, which are on the under Part of the Head, not on the Top. I obſerv'd

alſo that it could, and did by ſome contrivance Cover its Light, and make a kind of Dark Lanthorn.

This *Inſect* appears to be of the *Beetle* kind; it is of a dark brown Colour unpoliſht, when the Caſe Wings are open'd, it extends Two very large Membranous Wings, faſtned to the upper part of the *Thorax*; its head is Cover'd as it were were with a Shield, or broad-brim'd Hat.

The Two Eyes under the broad Covering are black, and very large, making almoſt the whole Head; there being little elſe to be ſeen: theſe are Movable, ſo that the *Animal* can thruſt them forward to the edge of its Hat. From between theſe are diſcover'd the Two hairy feelers, or perhaps Bruſhes to cleanſe the Eyes. Between theſe Eyes and the *Thorax* lies the Mouth: On the *Thorax* are Six Legs almoſt all of a Length. The Tail is made of Seven Shelly Rings, at the laſt

laſt of which are viſible the Two *Shining* Points. *RICHARD WALLER Eſq; his Obſerv. PHILOS. TRANSACT. Numb.* 167.

The Ingenious *Mr. John Templer*, in his accurate Obſervations upon this *Inſect*, one whereof he kept for ſome days in a Box, to enable him the better to make his Remarks, ſays, That he never ſaw her *Shine* without ſome Senſible Motion either in her Body or Legs; and that in her *Cleareſt Shining* ſhe extends her Body a Third Part beyond its uſual Length.

He further Obſerves, That, if his Senſes fail him not, ſhe emits a Senſible Heat in her *Clear Shining*. *PHILOSOPH. TRANSACT. Numb.* 72.

Wondrous things are promis'd from the GLOWORM; thereof Perpetual Lights are pretended, and Waters ſaid to be diſtill'd, which afford a Luſtre in the Night; and this is aſſerted by *Carden*, *Albertus*, *Gaudentinus*, *Mizaldus*, and many

more. But hereto we cannot with reason assent; for the Light made by this *Animal*, depends upon a *Living Spirit*, and seems by some Vital Irradiation to be actuated into this Luster. For, when they are dead, they *Shine* not, nor always while they are alive, but are obscure, or give Light, according to the Diffusion of this *Spirit*, and the Protrusion of their *Luminous* Parts, as Observation will instruct us. For this Flammeous Light is not over all the Body, but only visible on the inward side; in a small White part near the Tail. When this is full, and seemeth protruded, there ariseth a Flame of a Circular Figure, and *Emrald-Green* Colour; which is more Discernable in any Dark place, than day; but when it falleth and seemeth contracted, the Light disappears, and the Colour of that part only remains. Now this Light, as it appeareth and disappeareth in their Life, so doth it go quite out at their Death.

Death. As we have Obſerv'd in ſome, which, preſerv'd in freſh Graſs, have Liv'd and *Shin'd* Eighteen Days; but as they declin'd, their Light grew Languid, and at laſt went out with their Lives. *BROWN's Vulg. Errors.*

Obſervations concerning SPIDERS.

NOW let us ſee what we can diſcover in *Ovid's Lydian* Spinſtreſs, that proud Madam, which *Pallas*, for her Rivalſhip, transform'd into the SPIDER; which hath not only the Character of *Ariſtotle*, but of *Solomon* himſelf, for a Wiſe and Prudent Animal, and therefore a fit *Reſidentiary* in the Court of *Kings*.

Of Domeſtick SPIDERS there are Two Sorts; *One* with longer Legs, and a little Body, and the other contrariwiſe.

The Firſt eminent thing we found in theſe *Houſe*-SPIDERS, were their

their *Eyes*, which in ſome were Four, in ſome Six, and in ſome Eight, according to the proportion of their bulk, and length of their Legs. Theſe *Eyes* are plac'd all in the forefront of their Head (which is round, and without any Neck) all diaphanous and tranſparent, like a Locket of *Diamonds*, or a Set of round *Cryſtal Beads*: So that well might *Muffet* ſay of thoſe Philoſophers that held them blind, *Sanè cæcutiunt illi ſummo Meridie, qui videre ipſas non vident neque intelligunt*: Far better might he have ſaid it, if his Eyes had had the aſſiſtance of our *Microſcope*.

Neither wonder, why Providence ſhould be ſo *Anomalous* in this Animal, more than in any other we know of (*Argus*'s Head being fix'd to *Arachne*'s Shoulders.) For, *Firſt*: Since they wanting a Neck cannot move their Head, it is requiſite that defect ſhould be ſupply'd by the multiplicity of *Eyes*. *Secondly*: Since they were to live by catching

ſo

ſo nimble a Prey as a *Flie* is, they ought to ſee her every way, and to take her *per Saltum* (as they do) without any motion of their Head to diſcover her; which motion would have ſcar'd away ſo timorous an Inſect.

They have a very puffy light Body, of an Oval Figure, cover'd with a ſleek thin Skin; which they change once a Month, ſays *Muffet*; tho' I hardly believe they caſt their *Spoils* ſo often.

Their Skin is not pellucid, for I could never diſcover any pulſing Particle within them: She hath Eight Legs, four on each ſide, ſplit into ſmall oblong Fingers at the Ends, by which ſhe makes her curious *Web-Work*. Both Body and Limbs is all ſtuck over with ſmall Silver-Hairs, which the very *Air* will waft to and fro, as you may ſee in the *Microſcope*. *POWER*'s *Microſcop. Obſerv.* pag. 11, 12.

There are Multitudes of ſeveral ſorts of SPIDERS, whoſe Eyes, and

and moſt other Parts and Properties, are ſo exceedingly different from one another, that it would be almoſt endleſs to deſcribe them, as *Some* with Six Eyes, plac'd in quite another Order; *Others* with Eight Eyes, others with fewer, and *Some* with more. They all ſeem to be Creatures of Prey, and to feed on other ſmall *Inſects*, but their ways of catching them ſeem very differing: The *Shepherd* SPIDER by running on his Prey; The *Hunting* SPIDER by leaping on it; *Other Sorts* weave Nets, or Cobwebs, whereby they inſnare them, Nature having both fitted them with Materials and Tools, and taught them how to Work and Weave their Nets, and to lie perdue, and to watch diligently to run on any *Flie*, as ſoon as ever entangl'd.

Their Thread or *Web* ſeems to be Spun out of ſome *Viſcous* kind of *Excrement*, lying in their Belly, which, tho' ſoft when drawn out, is preſently, by Reaſon of its ſmall-

neſs,

neſs, harden'd and dried by the Ambient Air; examining ſeveral of which with my *Microſcope*, I found them to appear much like White *Horſe-Hair*, or ſome ſuch tranſparent horny ſubſtance, and to be of very differing Magnitudes; *Some* appearing as big as a *Pig*'s Briſtle; *Others* equal to a *Horſe-Hair*; Others no bigger than a Man's Hair; Others yet ſmaller and finer. I obſerv'd further, that the radiating Chords of the *Web* were much bigger, and ſmoother than thoſe that were Woven round, which ſeem'd ſmaller, and all over knotted or pearl'd, with ſmall tranſparent *Globules*, not unlike ſmall *Cryſtal-Beads* or *Seed-Pearls*, thin ſtrung on a Clew of Silk; which, whether they were ſo Spun by the SPIDER, or by the adventitious Moiſture of a Fogg (which I have obſerv'd to cover all theſe Filaments with ſuch *Cryſtalline Beads*) I will not now diſpute. *HOOK*'s *Microg. Obſerv.* 48.

The

The *long Threads* in the Air in Summer, and eſpecially towards *September*, have been a ſtrange puzzle to the Wiſer World. It would divert you, tho' you know them as well as I, if I ſhould here reckon up the ridiculous Opinions concerning them: but I ſhall omit them, and proceed to tell you the certain and immediate Authors of them, and how they make them.

I ſay then, that all SPIDERS, that Spin in a *Thread*, (thoſe, which we call *Shepherds*, or long-Legg'd SPIDERS, never do;) are the Makers of theſe *Threads*, ſo much wonder'd at, and in ſuch infinite quantities every where.

I ſent you the laſt Summer a Catalogue of *Thirty* ſorts of SPIDERS, that I had diſtinguiſht here with us in *England*; and I muſt confeſs, I had well near compleated that Number, with many other Experiments concerning them, before I diſcover'd this Secret.

I had

I had exactly Mark'd all the ways of *Weaving*, us'd by any ſorts of them, and in thoſe admirable Works I had ever noted that they ſtill let down the *Thread*, they made uſe of; and drew it after them. Happily at length, in nearly attending on One, that wrought a Net, I ſaw him ſuddenly in the Mid-Work to deſiſt, and turning his Tail into the Wind to dart out a *Thread* with the ſame violence and ſtream, as we ſee Water ſpout out of a Spring: This *Thread* taken up by the Wind, was in a moment emitted ſome Fathoms long, ſtill iſſuing out of the Belly of the Animal; by and by the SPIDER leapt into the Air, and the *Thread* mounted her up ſwiftly.

After this Diſcovery, I made the like Obſervation in almoſt all the ſorts of SPIDERS, I had before diſtinguiſh'd; and I found the Air fill'd with Young and Old, ſailing on their *Threads*, and undoubtedly ſeizing *Gnats* and other *Inſects* in their

their passage; there being often as manifest Signs of Slaughter, as Legs, Wings of *Flies*, &c. on these *Threads*, as in their *Webs* below.

One thing yet was a Wonder to me, *viz.* That many of these *Threads*, that came down out of the Air, were not single, but snarl'd and with complicable Wooly Locks, sometimes more, sometimes less; and that on these I did not always find SPIDERS, tho' many times I had found Two or Three upon One of them: Whereas when they first flew up, the *Thread* was still single, or but little tangl'd, or, it may be, thicker in one place than another. In the End, by good attention I plainly found, what satisfied me abundantly, and that was this; That I observ'd them to get to the top of a Stalk or Bough, or some such like thing, where they Exercise this Darting of *Threads* into the Air, and if they had not a mind to sail, they *either* swiftly drew it up again, winding it up with their

their Fore-Feet over their Head into a Lock; *Or* break it off ſhort, and let the Air carry it away. This they will do many times together, and you may ſee ſome of them, that have Chains of theſe Locks, or *Snarl'd Thread* before them, and yet not taken flight.

Again, I found, that after the firſt flight, all the time of their Sailing they make *Locks*, ſtill *Darting forth* freſh ſupplies of *Thread* to ſport and ſail by.

It is further to be Noted, that theſe *Complicated Threads* are much more tender, than our *Houſe-Webbs*.

In Winter and at Chriſtmaſs, I have obſerv'd them buſie a *Darting*, but few of them ſail then, and therefore but ſingle Threads only are to be ſeen; And beſides, they are but the Young Ones of laſt *Autumns* hatch, that are then employ'd; and it is more than probable, that the great Ropes of *Autumn* are made only by the great

Ones, and upon long Paſſages and Summer Weather, when great Numbers of Prey may invite them to ſtay longer up. *MARTIN LISTER's Obſerv. See the PHILOS. TRANSACT. Numb.* 50.

The Learned and Ingenious Mr. *King*, Chaplain to Mr. *Chetwynd* of *Staffordſhire*, tells us, that SPIDERS in projecting a *Thread* croſs a Room *in plano Horizontis* (which they do for their eaſier and more direct paſſage) raiſe themſelves on their Legs, as high as they can, ſetting them very ſtraight and ſtiff, and turning their hinder Parts up higher than uſual, they will ſhoot out a *Thread* to a great diſtance; which when faſten'd where they would have it, with their Fore-Legs they will wind up the *Thread* ſhorter till it is very ſtraight, as the *Funambuli* ſtrain their Ropes, and then like *them* too, will get upon it, and run from one end to the other.

And as to their *Sailing* at the Ends of theſe *Threads*, He further obſerved,

observed, not only that they *Sailed* much swifter than any *Wind* then stirring could carry them, but that at the same time they constantly *Sail'd* all the same way, which was not directly with, but as he once noted at *Eight Points* distance, as it were with a *Side-Wind*; which plainly shews, that they do not only *Row*, but *Steer* too, with the motion of their Feet, according as directed by some *Secret Instinct* they have in them. *PLOT of* Staffordshire, *Pag.* 239.

Mr. *Richard Stafford* in a Letter to the Ingenious Mr. *Oldenburg*, (an Extract whereof you have in the *Philos. Transact. Numb.* 40.) says, That the *Web* of a *Bermuda*-SPIDER is so strong, as to snare a Bird as big as a *Thrush*.

At *Gresham Colledge*, they have some of this *Web*, where it is wound upon a Paper like Raw Silk.

I know there are some that question the truth of the things related

of the TARANTATI (as the *Italians* call them that are bit by the TARANTULA SPIDER) and I eaſily grant, that ſome Fictions may have been ſuffer'd to paſs under the Countenance of ſo ſtrange a Truth. But beſides the Affirmations of ſome Learned Men, as well *Phyſicians* as others, my Doubts have been much remov'd by the Accounts I have received from an Ingenious Acquaintance of mine own, who at TARENTUM it ſelf, whence the *Inſect* takes its Name, and elſewhere, ſaw many bitten Perſons in their Dances, ſome in publick and ſome in private places, and amongſt the reſt a *Phiſician*, on whom the Tune that fitted his Diſtemper had the ſame Operation as on the other Patients. And the Learned *Epiphanius Ferdinandus*, who Practiſed Phyſick in *Apulia* and *Calabria* for many Years, not only delivers, upon his own Perſonal Obſervation, ſeveral Narratives of the Effects of *Muſick* upon the TARANTATI,

RANTATI, but invites any that may doubt of the Truth of ſuch Narratives to repair to him at a fit Seaſon, undertaking to convince them by Ocular Demonſtration. *ROB. BOYLE of lanquid motion*, pag. 75, 76.

Obſervations concerning the SILK-WORM.

THE uſe of SILK was brought over from the *Eaſt-Indies* into *Europe* above a Thouſand Years ſince, and was particularly introduc'd into *Italy* by Two Religious Men, who brought thither the *Grain* of it ſomewhat above Three Hundred Years ſince; in which Country of *Italy*, that Commodity hath been much Cultivated, and that upon ſeveral Accounts; as, the preciouſneſs of it, the eaſie Tranſportation from one place to another, by Reaſon of its lightneſs: And laſtly, for that it is one of the prin-

cipal Inſtruments of Luxury, which never wanted Partizans and Abettors in any Age, not to mention the great Advantages and Wealth attending the Manufacture of it. The Latine Word SERICUM is received from that of SERES, an Oriental People, who were more Sedulous in the Cultivation of it than any other: And the ſame thing that hath happen'd to this, as to many other Excellent Productions deriv'd from mean an deſpicable Principles. For the *Animal*, from whoſe Labour we have the SILK, is an *Inſect*, as are all thoſe which *Spin*, to wit, the *Spider* and the *Caterpillar*, and it differs in nothing from this latter, ſave that the *Caterpillar* hath a little Hairineſs, and the *Silk* of the *Silk-Worm* is ſtronger than the *Web* of the *Caterpillar*, and of another Colour, but as to figure and bulk there is little difference between them. Whereto may be added, that their production is much at one, as being as it were

were hatch'd of certain Eggs, living on Leaves, incloſing themſelves in certain Webs, out of which they make their way, after they are become a kind of *Butterflies*, by a ſtrange *Metamorphoſis*, which forces them from one Extremity to another, *That is*, from the Nature of *Reptiles* to that of *Volatiles*: Which Transformation is ſuch, as, were it not for the frequency of it, might be plac'd among the greateſt Miracles of Nature, conſidering the great difference there is between thoſe Two Forms. And that indeed is ſuch, as hath given ſome occaſion to doubt, whether the SILK-WORM becoming a BUTTERFLY did not change its *Species*, as certainly it would, were it not that every thing produces its like; and the SILK-WORM deriving its Birth from the Seed of the BUTTERFLY, it is an Argument that *both* are of the ſame *Species*. Thus much as to their Progreſs. The Kingdom of *Spain* commonly

furniſhes us with the beſt *Grain* or *Seed* of theſe Worms, which are like Heads of Pins, but black, or reſembling *Rape-Seed*, ſomewhat flatted on both ſides: This *Grain*, ſometime in the Month of *April*, being put between two warm Pillows, or expos'd to the Sun, enclos'd in the Linings of ones Cloaths, or otherwiſe chafed by a moderate Heat, but without any Moiſture, there are produc'd of it little certain Worms of the ſame Colour, *that is*, black at their firſt coming forth, which by Reaſon of their ſmallneſs, as reſembling the Points of Needles, paſs through certain little Holes made in a Paper, wherewith they are cover'd, and faſten themſelves on the *Mulberry-Leaves*, which are alſo placed on the ſaid Paper full of little Holes, upon which Leaves all the beſt *Grain* being hatch'd, within Five or Six Days, goes creeping after the firſt Worm that gets out of her Shell; all that is hatch'd afterwards

wards never coming to any good. Theſe Worms are thence tranſported, with the Leaves laid upon little Boards or Hurdles, into a temperate place, and diſpos'd in a lightſome and ſpacious Room, where they are Entertain'd with freſh Leaves twice a Day, among which thoſe of the *White Mulberry* make finer SILK, than thoſe of the *Black*; for want whereof, the Leaves of the *Roſe-Buſh*, *Lettice*, and ſome others may be uſed: But though the Worm makes a ſhift to Subſiſt by that Nouriſhment, yet either it will not *Spin* at all, or the SILK will be like the *Web* or *Clue* wrought by the *Caterpillars*. Thus it feeds for the ſpace of Forty Days, during which it becomes Grey, and changes its Colour four times, not eating for ſome Days before each Change, by reaſon of the fullneſs it is then ſenſible of. The Worm is ſubject to certain Diſeaſes; and thoſe oblige ſuch as have the care of them to remove them

them out of one Room into another, and that even when they are dying in great quantities; Perfume, Incenſe, Benjamin, Vinegar, and Wine recovering and comforting them; as alſo the ſmell of broil'd Bacon. To prevent which Diſeaſes, and the Aſſaults of Flies and Piſmires, who will make havock among them, they are very carefully to be kept clean, the Boards on which the Leaves lie to be rubb'd with Wormwood, or ſprinkled with Wine, which muſt be well dry'd up before they come near them, all moiſture being hurtful to them, as alſo Salt, or the hands that have handled it. All harſh ſounds, as thoſe of the diſcharging of Muskets, Bells, and Trumpets, deſtroy them; nay, the ſtrong Breaths of thoſe who come near them, eſpecially ſuch as have eaten or handled Garlick or Onions, are very prejudicial to them. When their time of *Spinning* draws nigh, which is about Six Weeks after their being firſt alive,

live, at which time they are about the bigneſs of a Man's little Finger, more tranſparent than they uſe to be, and the little Snowt ſo lengthned, as that it repreſents the form of a Noſe, the Animal by an extraordinary motion, expreſſes the inconvenience it endures by Reaſon of its burthen: Then is it cleans'd oftner, and there is ſo much the leſs given it to eat, and afterwards they ſet on the Boards ſome dry'd Branches of Heath, Broom, or Vines, and above all of Birch, as being the moſt delicate and leaſt prickly, leſt it ſhould prick the Worm, or entangle the SILK. Then you ſhall ſee them faſten their firſt Threads, and caſting out of their Mouths a kind of coarſe Sleeve SILK, and afterwards that which is finer and more perfect, in one continu'd Thread, accompany'd with a Gum, which makes it ſtick one to another, ſo that the Worm does encompaſs it ſelf with that SILK, which is commonly Yellow,

Yellow, very ſeldom Greeniſh or White, and being come to the end of the *Clue*, hath only ſo much room as it takes up. Then, for the ſpace of Fifteen Days, it remains immoveable, and is cover'd with a Skin or Film like that which covers the Fruit of the Pine-Tree, under its Shell, and which appears not till after that is broken. But theſe Fifteen Days being over (of which thoſe will abate ſome, who are deſirous to make advantage of the SILK, and trouble not themſelves what becomes of the *Grain*) the SILK-WORM, though it ſeem'd to have been dead, breaks through its Web, and comes out in the form of a White and Horned BUTTERFLY, bearing a certain Image of the Reſurrection; then coming together, the *Male*, which is ſmaller, coupling with the *Female* that is bigger, the latter ſheds her Seed upon a clean Paper, ſpread under her for the Reception of it. The Seed being carefully put into a Box

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is either kept for the next Year, or ſold by the Ounce; they commonly keep as much as comes from a Hundred *Males*, and ſo many *Females*; the Grain or Seed whereof, before their Copulation, is barren. Now, if they be deſirous to get SILK out of it, which is the principle Advantage, in order to which the Worms are kept, about Fifteen Days after they are compleated, theſe Webs are caſt into Water, ſomewhat better than luke-warm, and the Women and Children employ'd about that Work, ſtir the Water with an handful of Birch, till they have faſten'd on Seven or Eight Ends of SILK, which having done, they wind it up into Skains, and that is the Raw SILK. *PHILOS. CONFER. of the VIRTUOSI of* France, *Vol.* 2. *Pag.* 402, 403, 404.

'Tis to be imagin'd that the uſe of SILK was abſolutely unknown to the *Jews*, eſpecially when we conſider, that in the Works of that Magnificent

Magnificent Temple of *Solomon*, Wherein they ſpar'd not any thing of what they thought moſt precious, there is no mention made of SILK, inſtead whereof they made uſe of *Goats-Hair*, and other precious Fleeces. But it was no ſtrange Commodity to the *Greeks* and *Romans*; not to the former, ſince that *Pariſatis*, the Mother of *Cyrus*, was commonly wont to ſay, That *Kings* were always to be ſpoken to in SILKEN Words; nor yet to the latter, inaſmuch as they had ſome Garments all of SILK, whick they call'd *Veſtes Holoſericas*. Which is the more to be Credited, in regard the Inhabitants of *China*, who made uſe of it above a Thouſand Years before us, have very Ancient Books, whereof the Paper is made of SILK. *Ibid. Pag.* 405.

Italy abounds in SILK and SILK-Worms; out of which they draw a notable profit, and for the feeding of them they keep a World of *Mulberry-Trees*, whoſe Leaves are the

the Food of thoſe little Worms, whoſe Excrement is our Pride; thus, *Adam* like, we are Clad in *Leaves* again, but *Leaves* once remov'd. *LASSEL's Voyage of* Italy, *Pag.* 2.

Monſieur Iſnard in his *French* Treatiſe of SILK-WORMS, ſaith, That before they begin to *Spin*, and about the latter end of their Feeding, They muſt be often ſhifted and chang'd, and have Air enough, by opening the Windows of the Room they are in, if it be not too ill Weather; elſe, ſaith he, the SILK that is in their Belly, will cauſe ſo extraordinary a heat in them, that it burns their Guts, and ſometimes burſts them; and the ſame (being a Subſtance that reſembles Gum or *Burgundy* Pitch) will putrifie and turn into a Yellowiſh Matter.

Mouſet affirms, That in the Tranſmutation of the *Worm* into a *Fly*, the Head of the *Worm* makes the Tail of the *Fly*; and the Tail of

of the *Worm* the Head of the *Fly*. But *Sig. Malpighius* makes no mention hereof; neither is it any way likely to be so. *GREW's Mus. Reg. Soc. Pag.* 176.

An Ingenious Gentlewoman of my Acquaintance, Wife to a Learned *Phisician*, taking much Pleasure to keep SILK-WORMS, had once the Curiosity to draw out one of the *Oval Cases*, (which the SILK-WORM *Spins*, not, as 'tis commonly thought, out of its *Belly*, but out of the *Mouth*, whence I have taken Pleasure to draw it out with my Fingers,) into all the SILKEN-Wire it was made up of, which, to the great Wonder as well of her Husband, as her self, who both inform'd me of it, appear'd to be by Measure a great deal above Three Hundred Yards, and yet weighed but two Grains and a half: So that each *Cylindrically* shap'd Grain of SILK may well be reckon'd to be at least One Hundred and Twenty Yards long. *ROB. BOYLE of Effluviums, Pag. XI.*

Obser-

Obſervations concerning SNAKES, *or* SERPENTS, *or* VIPERS.

IN *Barbadoes* there are SNAKES about a Yard and a half long, that will ſlide up the Perpendicular Wall of a Houſe out of one Room into another. A greater agility without Feet, than we ſee in moſt Creatures that have Four. Much helped, as it ſhould ſeem, by their great length; whereby they can, in an inſtant, reduce themſelves into ſo many more undulations for their better aſcent. *GREW's Muſ. REG. SOC.*

In *Braſile*, ſaith *Joh. de Laet*, there are SNAKES found ſometimes 25 or 30 Foot long. They have alſo a ſort of SERPENT call'd the RATTLE-SNAKE, from the *Rattle* at the end of his Tail. By this *Rattle*, thoſe that Travel through the Fields, or along the High-Ways, are warned to avoid coming near ſo noxious a Creature. For thoſe

that are bitten with him, ſometimes die miſerably in 24 Hours; their whole Body cleaving into Chops. They commonly bury the Limb that is bitten, and ſo keep it, till the Pain wears off. The progreſſive Motion of this SNAKE, ſays *Joh. Lerius*, is ſo ſwift, that they ſeem to fly. Which makes the *Rattle* to be ſo much the more uſeful in giving timely notice of their approach. Some of the largeſt are in *Panuco*, a Province of *Mexico*. It is affirm'd by *Marggravius* and others, that as many Years old as the SERPENT is, the *Rattle* hath ſo many Joynts. Which if it be true, then they will live at leaſt Sixteen Years, ſome *Rattles* conſiſting of Sixteen Joynts: Which makes the Tradition very ſuſpicious. *GREW's Muſ. REG. SOCIET.* pag. 48, *&c.*

The *Engliſh* VIPER caſts its *Slough*, or *Cuticula*, twice every Year, *viz.* at Spring and Fall. The Separation begins at the Head; and

and is finiſh'd in the ſpace of 24 Hours, from all parts ſo entire, that the very *Tunica Adnata*, or Outward Skin of the Eye it ſelf is plainly to be ſeen. *Ibidem.*

That Curious *Italian*, called *Franceſco Redi*, in his Diſcourſe of VIPERS, obſerves, that the Poyſon of VIPERS, is neither in their *Teeth*, nor in their *Tail*, nor in their *Gall*; but in the two *Veſicles* or *Bladders*, which cover their *Teeth*, and which being compreſs'd, when the VIPERS bite, do ſend forth a certain *Tellowiſh Liquor*, that runs along the Teeth, and Poyſons the Wound. Whereof he gives this Proof, that he hath rub'd the Wounds of many *Animals* with the *Gall* of VIPERS, and prick'd them with their *Teeth*, and yet no conſiderable ill Accident follow'd upon it, but that as often as he rubb'd the Wounds with the ſaid *Tellow Liquor*, not one of them eſcap'd.

He also *observes*, that where commonly it hath hitherto bee believ'd, that the Poyson of VI PERS being swallow'd, was prese Death; *He*, after many reiterate Experiments, tells us, that in VI PERS there is neither Humour nor Excrement, nor any part, nay not the *Gall* it self, that, being ta ken into the Body, kills. And *H assures* us, that he has seen Me eat, and has often made Brute Ani mals swallow all that is esteem' most poysonous in a VIPER, ye without the least Mischief to them And therefore what some Author have affirm'd, *viz.* That it is Mor tal to eat of the Flesh of Creature kill'd by VIPERS, *Or* to drink o the Wine wherein VIPERS have been drown'd; *Or* to suck the Wounds that have been made by them, is by this Author observ'd to be utterly false. For *He affirms* That many Persons have eaten Pul lets and Pigeons, bitten by VIPERS, without finding any alteration from

it in their Health. On the contrary, *He* declares, That it is a Soveraign Remedy againſt the biting of VIPERS, to ſuck the Wound; alleadging an Experiment made upon a Dog, which he caus'd to be bitten by a VIPER at the Noſe, who, by licking his own Wound, ſav'd his Life. Which *He* affirms by the Example of thoſe People, Celebrated in *Hiſtory* by the Name of *Marſi* and *Pſilli*, whoſe Employment it was to heal thoſe that had been bitten by SERPENTS, by ſucking their Wounds.

Again, *He adds*, That altho *Galen*, and many Modern *Phyſicians*, do affirm, that there is nothing, which cauſeth ſo much Thirſt, as VIPERS-Fleſh, yet he hath Experimented the contrary, and known divers Perſons, who were wont to eat the Fleſh of VIPERS every Meal, and yet did aſſure him, They never were leſs dry, than when they obſerv'd that kind of Dier.

As for the *Salt* of VIPERS, whereof ſome *Chymiſts* have ſo great eſteem, *He ſaith*, That it hath no *Purging* Virtue at all in it: Adding, that even of all *Salts*, none hath more Virtue than another. *FRANCESCO REDI of VIPERS.*

All *Indians* carry a *Powder* about them to cure the Bites of SNAKES, and almoſt in every Town this *Powder* hath a different Compoſition, and every Compoſition is certainly Effectual to the correcting the Malignity of the Venom. Neither was it ever known to us, that any *Indian* ſuffer'd much harm by being bitten, but in a Days time he would be as well as if he had never been bitten: Whereas ſome of the *Engliſh* for want of a ſpeedy Remedy have loſt their Lives, and have periſh'd in great Miſery. *THO. GLOVER's Account of VIRGINIA, in the PHILOS. TRANSACT. Numb.* 126.

Several

Several have taken notice, that there is a difference between the Brooding of SNAKES and VIPERS; thoſe laying their Eggs in *Dung-hills*, by whoſe warmth they are hatch'd; but theſe (VIPERS) Brooding their Eggs within their Bellies, and bringing forth live VIPERS. To which may be added, That ſome affirm to have ſeen SNAKES lie upon their Eggs, as Hens ſit upon theirs. *PHILOS. TRANSACT. Numb.* 8. *Pag.* 138.

In the Lordſhip of *Blechington*, and all the more Northern Parts of *Oxfordſhire*, no SNAKES have been ever, or very rarely ſeen; in ſo much that I met with ſeveral Ancient People about *Deddington* and *Banbury* that ſcarce ever ſaw a SNAKE in their lives, at leaſt not in that Countrey. And at *Blechington* 'twas confidently believ'd, that a SNAKE brought from any other place, and put down there, would inſtantly die, till I made

the Experiment and found no such matter: Whereupon I got leave (in the absence of the *Family*) to include my SNAKE in the Court, before the Right Honourable the Lord *Anglesey*'s House, to see what time would produce, leaving the Gardener in trust to observe it strictly, who found it, indeed, after three Weeks time dead, without any sensible external hurt.

How this should come to pass, is a Question indeed not easie to determine; but certainly it must not be ascrib'd to the *Talismanical* Figure of the Stone *Ophiomorphites* to be found about *Adderbury*, and in most *Blue Clays*, whereof there are plenty in this Country. Since these are to be met with about *Oxford* too, and many other places, where there are SNAKES enough. Beside, we are inform'd by *Cardan*, that *Albertus Magnus* had a Stone, that being naturally markt with the Figure of a SERPENT, had this no less admirable than contrary

Virtue,

Virtue, that if it were put into a place that was haunted with SERPENTS, it would draw them all to it. Much rather may we subscribe to the Cause assigned by *Pliny*, who seems confidently to assert, that the Earth that is *Blackish*, and standeth much upon *Salt-Peter*, is freer from *Vermin* than any other. To which we may add, if need be, *Sulphur* and *Vitriol*, whereof there is plenty in these parts of the Country; but whether by *One*, *Two*, or *All* these, though we dare not pronounce, yet that it is caused by some such *Mineral Steam* disagreeable to the *Animal*, I think we may be Confident. *PLOT of Oxfordshire*, pag. 187.

My Father in his *Voyage to the Levant*, giving an Account of what he observ'd in *Egypt*, has, among other remarkable Things, this passage: Many Rarities of living Creatures I saw in *Gran Cairo*, but the most Ingenious was a Nest of Four-Legged

Legged SERPENTS, of Two Foot long, Black, and ugly, kept by a Frenchman, who when he came to handle them, they would not endure him, but ran and hid in their Hole; then would he take his *Cittern*, and play upon it; *They*, hearing his *Muſick*, came all crawling to his Feet, and began to climb up him, till he gave over playing, then away they ran. *Sir HENR. BLOUNT's Voyage into the Levant, Pag.* 58, 59.

That which is mentioned by *Sir Henry Blount* about the Effect of *Muſick* upon SERPENTS at *Grand Cairo*, may be not only confirm'd but exceeded, by a ſtrange Relation that I had from a Perſon of unſuſpected Credit. Which Narrative having appear'd to me ſo conſiderable, as well to deſerve a place among my *Adverſaria*, I ſhall ſubjoyn that part of it which concerns our preſent Subject, in the Words wherein I find it ſet down.

Sir

Sir J. C. A very candid and judicious Traveller, favouring me yesterday with a Visit, told me among other remarkable Things relating to the *East-Indies*, (which Countries He had curiously visited,) that He, with divers *European* Merchants had seen, (and that if I mistake not, several times) an *Indian*, who by many was thought to be a *Magician*, that kept tame SERPENTS of a great Bulk. And that when the Owner of them plaid upon a *Musical Instrument*, these SERPENTS would raise themselves upright into the Air, leaving upon the Ground but 3 or 4 Inches of their Tail, upon which they lean'd for their Support. *He added*, that at the same time that they erected their Bodies, they also stretcht and lengthen'd them in a strange and frightful manner; and whilest they were thus slender, they were taller than He, or any Man of ordinary Stature. But that which appear'd to Him the most Wonderful and Surprizing,

Surprizing, was, that they manifeſtly ſeem'd to be very much affected with the *Muſick* they heard; inſomuch that ſome parts of the Tune would make them move to and fro with a ſurpriſing agility, and ſome other Parts of it would caſt them into a Poſture, wherein they ſeem'd to be half aſleep, and as it were to melt away with Pleaſure. *ROB. BOYLE of the* Inſalubrity *and* Salubrity *of the Air*, pag. 135, 136, 137.

The VIPER, ſaith *Sir Thomas Brown*, from the Experience of Credible Perſons, in Caſe of fear, receiveth her Young Ones into her Mouth; which being over, they return thence again. *BROWN's Pſeudod. Epidem.*

The chief Uſe of VIPERS is for the making of *Treacle*, and for that purpoſe, the young *Feamales* are the beſt, being taken in the Spring, after they have been a while out of their Dens.

The

The *Indians*, in ſome places, eat SNAKES very greedily.

Obſervations concerning TORTOISES.

DR. *Grew* ſaith, That the *Sea-Tortoiſe* differs from the *Land-Tortoiſe*, chiefly, in having a more rude, and ſofter Shell, and Feet rather like the *Finns* of a Fiſh, as proper to Swim with.

Rondeletius affirms, That he Squirts the Water out at his Noſtrils, in the ſame manner as the *Dolphin* doth at his Spout.

Trapham in his Diſcourſe of *Jamaica*, *Cap.* 4. ſays, That in Generation, the Embraces of the *Male* and *Female* do continue for a whole Lunary Month.

They abound in the *Caribee* and *Lucayick* Iſlands, and in *Jamaica*, as alſo in the *Red-Sea*.

I remember that in a place called the *Camanas*, which lyeth to the Lew-

Lew-Ward of *Jamaica*, the Sea TORTOISE (of which there are Five Sorts) or TURTLES, as ſome call them, thoſe Triple-Hearted Amphibious Creatures (for they have each of them three diſtinct Hearts) being entangled in a Sain or Net, which was uſually ſet for the taking of them, or elſe being turned on their Backs on Land (for then they cannot turn themſelves on their Feet again) did always Sigh, Sob, ſhed Tears, and mightily ſeem to Lament, as being moſt ſenſible of their Deſtruction, and that they were in their Enemies hands. *WILL. HUGHES's Pref. to The American Phyſician.*

Sir Philiberto Vernatti, late Reſident in *Java Major*, ſaith, That he had ſeen in thoſe parts ſome Sea-TORTOISES of Four Foot broad, in Oval Form, very low Legg'd, but of that ſtrength, that a Man might ſtand on one: That the manner of catching them, was to turn them with a Fork upon their Backs.

SPRAT's

SPRAT's Hist. of the ROYAL SOCIETY, pag. 170.

All the TORTOISES, from the *Caribes* to the *Bay of Mexico* and *Honduras*, repair in Summer to the *Cayman Islands*, to lay their Eggs and to hatch there. They *Coot* for Fourteen Days together, then lay in one Night some Three Hundred Eggs, with White and Yolk, but no Shells: Then they *Coot* again, and lay in the Sand, and so thrice. Then the *Male* is reduced to a kind of Gelly within, and blind, and is so carried home by the *Female*. Their Fat is Green, but not offensive to the Stomach, though you eat it as Broth, Stew'd. Your Urine looks of a Yellowish-Green, and Oily, after eating it. *Dr. STUBBES's Observ. Sailing from* England *to the* Caribe-Islands, *in PHILOS. TRANSACT. Numb.* 27.

During an Hour or Two's stay, at the *Caymans*, I examin'd that Assertion of Mr. *Lygans*, that a

TORTOISE

TORTOISE hath *Three Hearts*, and I found it false. For, although the resemblance of the Two *Auricles* be such, as also their Bodies or Flesh, as to deceive the unwary Observer; yet is there but *One Heart*, triangular and fleshy; the other Two are only the *Auricles*, yet of the same Shape and Body. The Two *Auricles* move at a several time from the *Heart*, and they are distanc'd from the *Heart* about an Inch; and the passage fleshy (as I remember) and narrow, by which the Blood is infus'd into the Heart. This *Heart* hath but One *Ventricle*; yet are Three several Columns of Flesh, and receptacles in it, such as are not in the *Auricles*——The TORTOISES *Bite* much more than they *Swallow*, so that the Sea is cover'd with the Grass, where they feed at the bottom. Once in about half an Hour they come up, and fetch one Breath like a Sigh, and then sink down again. And if out of the Water,

Water, they Breath somewhat oftner. If you hurt them on Shore, as they lie on their Backs, the Tears will trickle from their Eyes. You may keep them out of the Water Twenty Days and more, and yet they will be so Fat as to be very good Meat, provided you give them twice a Day about half a Pint of Salt-Water. The Fat that is about their Guts, is *Yellow*, though that of the Body be *Green*. The Head being cut off, dies instantly; and if you take out the Heart, the motion continues not long. But any quantity of the Flesh will move, if pricked, and also of it self, for many Hours after it is cut into Quarters; and the very Joynts of the Bones of the Shoulders and Legs (answering our *Omo-Plate* and Thigh, yet within the Shell) have their motion; and even though you prick only the Fat of it. But if you place these parts of the TORTOISE in the Sun, they presently die. The Legs die as soon,

in a manner as cut off. *STUBBES*'s Enlargement *of the former Observ. PHILOS. TRANSACT. Numb.* 36.

Trapham in his Discourse of *Jamaica*, saith, That the Flesh of a TORTOISE maketh a most pleasant Jelly: And that the *Callapee*, *viz.* the Belly-part so called, baked, is an excellent Dish.

The Legs, saith *Schroder* out of *Solenander*, applied to the part affected, are a most Experienc'd Remedy in the Gout.

In *Turky*, the *Shells* are used for Bucklers: In *Tabrobana*, (according to *Ælian*) to cover their Houses: And in *China*, to make Girdles for Noble Men.

In the Kingdom of *Tunquin* in *India*, there are infinite Number of TORTOISES, which are esteem'd such excellent Food, that the *Tunquineses* and *Cochinchineses* do not believe they have entertain'd their Friends at a Banquet as they ought to do, till the TORTOISES are brought

brought in. Those two Nations pickle up great Quantities of them, and send them abroad, which is a vast Trade among them; and indeed the chiefest occasion of the Wars between them is, because the *Cochinchineses* do all they can to hinder the *Tunquineses* to Fish for them, alledging that those Seas and Islands, where they breed, belong to them. Neither is the *Meat* but the *Shell* also of great esteem, and one of the most considerable Commodities for Trade in *Asia*. *TAVERNIER's Relat. of the Kingdom of* Tunquin, *Cap.* 3.

Observations concerning several Remarkable TREES.

IN the Islands of *Solon* and *Timor* in the *East-Indies*, there grows a Tree called the STINKING-TREE; and indeed, well may it be so called: For it naturally smells like the strongest *Humane Excrements*, especially, as upon the Emptying of a *House of Office*. Sir *Philiberto Vernatti* procur'd an Arm of this TREE, and sent it to the ROYAL SOCIETY at *Gresham* Colledge. Where, though it hath now been preserv'd many Years, yet seems to give as full and quick a Scent as ever. Yet in burning, it yields no smell; as do *Lignum Aloe*, and some other Woods. 'Tis ponderous, hard, and of the Colour of *English-Oak*; and as that hath large *Aer-Vessels*; yet but few. I should have conjectur'd, saith *Dr. Grew*, that this Wood belong'd to the TREE called *Ahovai*, which hath

hath a Stinking ſmell, but that *this* is ſaid to be the more odious when it burns. *GREW's Muſ. REG. SOC. Pag.* 180.

There is in *Jamaica* a ſort of Tree called the SOAPE-TREE; the Berries whereof (being as big as Bullets of Muſquets) without any proportion of Salt-Lixiviate, or Sulphur, or Oile, waſh better than any *Caſtile*-SOAPE; but they rot the Linnen in time. The *Negro's* uſe them. *Dr. STUBBES.*

In the *Caribe-Iſlands* grows the famous TREE called the *Cabbage-Tree*; which, tho one would not imagine, I aſſure you, ſaith *Dr. Stubbes*, is a ſort of *Palme-Tree*: All that part which is eaten as the *Cabbage*, is, what ſprouted out that Year, and ſo is tender. If eaten raw, it is as good as *New-Almonds*; and if boil'd, it excels the beſt *Cabbage*. When that Top is cut off, the TREE dies. The *Dr.* ſaith, There was one of thoſe TREES at *Barbadoes*, above Three Hun-

dred Foot high, as He was credibly inform'd. This TREE will never Rot, and when 'tis dry'd, grows so hard, that you cannot drive a Nail into it. *STUBBES Account of the* Caribe-Islands.

In *Barbadoes* there is a particular sort of TREE called the POYSON-TREE. Its Leaves are full out as large and beautiful, as the *Lawrels*, and so like, as not to be known asunder. The People that have liv'd long there, say, 'tis not wholesome to be under the Shade of this TREE. The Work-Men, as they cut them down, are very careful of their Eyes; and those that have *Cipers*, put it over their Faces; for if any of the Sap fly into their Eyes, they become Blind for a Month. A *Negro* had two Horses to walk, which were left with him by two Gentlemen; and the Horses beginning to fight, the *Negro* was afraid, and let them go; and they running into the Wood together, struck at one another, and

their

their Heels hitting ſome young TREES of this kind, ſtruck the poyſonous Juice into one anothers Eyes, and ſo their Blindneſs parted the Fray, and they were both led home Stone Blind, and continued ſo a Month, all the Hair and Skin peeling off their Faces. Yet, of this Timber they make all, or the moſt part, of the Pots they *Cure* their *Sugar* in; for being Sawed, and the Boards dryed in the Sun, the POYSON vapours out. *LIGON's Hiſt. of* Barbadoes. pag. 68.

He alſo tells us of a certain Sort of POYSONOUS CANE, ſo like the SUGAR-CANE, as hardly to be diſcern'd the one from the other: This Plant hath this Quality, that whoſoever chews it, and ſucks in any of the juice, will have his tongue, mouth, and throat, ſo ſwell'd, as to take away the faculty of Speech for two days, and no remedy but patience. *Ibidem Pag.* 69.

Among the Rarities of the *Malacca*, or rather of the World, is the *Arbor Triſtis*, which bears Flowers only after Sun-ſet, and ſheds them ſo ſoon as the Sun-riſes, and this every Night in the Year. *ROB. MORDEN*'s Geogr. *Pag.* 413.

In the *Molucca* Iſlands, in the *Eaſt-Indies*, there is a certain Wood, which, laid in the Fire, burns, ſparkles, and flames, yet conſumes not; and yet a Man may rub it to Powder betwixt his Fingers. *MANDELSLO*'s *Travels into the* Indies, *Pag.* 133.

In the *Philoſophical Tranſactions* we have an Account of a ſort of INCOMBUSTIBLE CLOTH, called *Linum Asbeſtinum*: which was eſteem'd by the *Ancients* (though then more common, and perhaps better known than 'tis yet amongſt us) equally precious with the beſt of Pearls. But as great a Rarity as it now is, it ſeems one Mr. *Nich. Waite*, Merchant of *London*, hath lately

lately procur'd a piece of it; an Account whereof he gives in a Letter to *Dr. Plot*, He says, he receiv'd it from one *Conco*, a Natural *Chinese*, Resident in the City of *Batavia* in the North East parts of *India*. Who, by means of *Keayarear Sukradana* (likewise a *Chinese*, and formerly chief *Customer* to the old *Sultan* of *Bantam*) did after several Years diligence, procure, from a great *Mandarin* in *Lanquin* (a Province of *China*) near ¼ of a Yard of the said *Cloth*; and declar'd, that he was credibly inform'd, that the Princes of *Tartary*, and others adjoyning to them, did use it in *burning* their *Dead*; and that it was said and believ'd by them, to be made of the under part of the *Root* of a *Tree* growing in the Province of *Sutan*; and was supposed, in like manner, to be made of the *Todda* Trees in *India*: And that, of the upper part of the said *Root*, near the Surface of the Ground, was made a finer Sort, which in three

three or four times burning, the said *Mr. Waite* saith, He has seen diminish almost half: They Report also, that out of the said *Tree* there distils a *Liquor*, which not consuming, is used with a *Wick* made of the same Material with the *Cloth*, to burn in their *Temples* to posterity.

Mr. Waite shew'd a *Handkerchief* or *Pattern* of this INCOMBUSTIBLE LINNEN to the ROYAL SOCIETY; which being measur'd, was found in length Nine Inches, between the *Fringe* or *Taffells*; the *Fringe* at each end being three Inches more; so that the whole was just a Foot in length; and the breadth was just half a Foot.

There were two *Proofs* of its resisting *Fire*, given at *London*: One, before some of the Members of the *R. Society*, privately, *Aug.* 20. 1684. when *Oyl* was permitted to be poured upon it whilst red hot, to enforce the Violence of the *Fire*: Before it was put into the Fire this

First

Firſt Tryal, it weighed one Ounce, Six Drams, Sixteen *Grains*, and loſt in the burning Two Drams, Five Grains.

The Second *Experiment* of it was publick before the SOCIETY, *Nov.* 12. following, when it weighed (as appears by the *Journal* of the SOCIETY) before it was put into the *Fire*, One Ounce, Three Drams, 18 Grains. Being put into a clear *Charcoal Fire*, it was permitted to continue Red hot in it, for ſeveral Minutes: When taken out (though red hot) it did not conſume a piece of White Paper, on which it was laid: It was preſently Cool, and upon weighing it again, was found to have loſt one Dram, Six Grains. *PHILOS. TRANSACT. Numb.* 172.

That this LINNEN was very well known to the *Ancients*, beſide that of *Pliny*, we have the further Teſtimony of *Cælius Rhodiginus*, who agrees with the aforeſaid Account in Mr. *Waites* Letter to *Dr. Plot*,

Plot, placing both the *Materials* and Manufacture of it in *India*; and *Paulus Venetus* more particularly in *Tartary*, the *Emperour* whereof, He says, sent a piece of it to Pope *Alexander*. It is also mentioned by *Varro*; and *Turnebus* in his Commentary upon him, *De lingua Latina*. And by all of them as a thing inconsumable by *Fire*. In these latter Ages; *Georg. Agricola* tells us, that there was a *Mantle* of this LINNEN at *Vereburg* in *Saxony*; and *Simon Majolus* says, He saw another of it at *Lovain* exposed to the *Fire*. *Salmuth* also acquaints us, that one *Podocattarus*, a *Cyprian* Knight, shew'd it publickly at *Venice*, throwing it into the *Fire* without scruple or hurt; and Mr. *Lassells* saw a piece of it in the Curious *Cabinet* of *Manfred Septalla*, Canon of *Milan*. Mr. *Ray* was shew'd a Purse of it by the Prince *Palatin* at *Heidleberg*, which he saw put into a Pan of burning *Charcoal* till it was red hot, which when

when taken out and cool, he could not perceive had receiv'd any harm; and we are told in the *Burgundian Philoſophy*, of a long *Rope* of it, ſent from *Signior Bocconi* to the *French King*, and kept by *Monſieur Marchand* in the King's Gardens at *Paris*, which tho' ſteeped in *Oyle*, and put in the *Fire*, is not conſumed. To which add, that we have now ſeen a piece of this LINNEN paſs the fiery Trial both at *London* and *Oxford*. So that it ſeems to have been known in all Ages, all deſcribing it after the ſame manner, as a thing ſo inſuperable by *Fire*, that it only *Cleanſes* and makes it better. *Dr. ROB. PLOT, in the PHILOS. TRANSACT. Numb.* 172.

The ſaid *Dr.* ſaith, that this INCOMBUSTIBLE CLOTH is now of no Mean value even in the *Country* where made, a *China Covet*, that is, a piece 23 Inches and three Quarters long, being worth 80

Tale,

Tale, that is, Thirty Six Pounds Thirteen Shillings, and four pence.

PURCHAS saith, that in *Fanfur*, a Kingdom of *Java*, in the *East-Indies*, there is a *Tree* of a great bigness, and length; the *Pith* whereof is *Meal*, which they put in water, and stir well, the lightest dross swimming, and the purest settling to the bottom; and then the water being cast away, they makethere of *Paste*, which tasts just like *Barly* Bread.

The Wood of this *Tree* thrown into water, sinks like *Iron*; hereof they make *Lances*, but short, for if they were long, they would be too heavy for use: These they sharpen, and burn at the tops, which, so prepar'd, will pierce *Armour* sooner than if they were made of *Iron*. *PURCH. Pilg. Vol.* 3. *Pag.* 104.

In great *Java* they say, there is a *Tree*, whose *Pith* is Iron: It is very small, yet runs from the top to the bottom of the Plant.

The

The Fruit that grows on it, is not to be piere'd with Iron. *JUL. SCALIG. Exercit.* 181. *Sect.* 27.

In the Iſland *Cimbubon* there grows a *Tree*, whoſe Leaves fallen upon the ground, do move, and creep. It hath Leaves like the *Mulberry Tree*. They have on both ſides that which looks like two little feet; preſſed, they yield no Liquor. If you touch them, they flye from you. One of them kept eight days in a Diſh, liv'd, and moved, as oft as one touch'd it. *JUL. SCALIG. Exercit.* 112.

The SENSITIVE PLANT is ſomewhat of this Nature, which contracts it ſelf, if any one puts his hand to it; and if you pull back your hand, it recovers it ſelf again.

Obſer-

Observations concerning MOUNTAINS.

SOme have thought that MOUNTAINS and all other Irregularities in the Earth have rise from *Earthquakes*, and such like Causes; *Others* have thought that they came from the *Universal Deluge*; yet not from any Dissolution of the Earth that was then, but only from the great agitation of the Waters, which broke the ground into this rude and unequal Form. Both these Causes seem to me very incompetent and insufficient. *Earthquakes* seldom make MOUNTAINS, they often take them away, and sink them down into the Caverns that lie under them; Besides, *Earthquakes* are not in all Countries and Climats as MOUNTAINS are; for, as we have observ'd more than once, there is neither *Island* that is Original, nor *Continent* any where in the Earth, in

in what Latitude soever, but hath MOUNTAINS and *Rocks* in it. And lastly, what probability is there, or how is it credible that those vast Tracts of Land which we see fill'd with MOUNTAINS both in *Europe*, *Asia*, and *Africa*, were rais'd by *Earthquakes*, or any Eruptions from below? In what Age of the World was this done, and why not continued? As for the *Deluge*, I doubt not but MOUNTAINS were made in the time of the *General Deluge*, that great Change and Transformation of the Earth happen'd then, but not from such Causes as are pretended, that is, the bare rowling and agitation of the Waters: For if the Earth was smooth and plain before the *Flood*, as *they* seem to suppose as well as *we* do, the *Waters* could have little or no power over a smooth Surface to tear it any way in pieces, no more than they do a Meadow or low Ground when they lie upon it; for that which makes

Torrents and Land Floods violent, is their fall from the MOUNTAINS and high Lands, which our Earth is now full of, but if the Rain fell upon even and Level Ground, it would only sadden and compress it; there is no possibility how it should raise MOUNTAINS in it. And if we could imagine an *Universal Deluge* as the *Earth* is now constituted, it would rather throw down the *Hills* and MOUNTAINS, than raise new ones; or by beating down their Tops and loose parts, help to fill the *Valleys*, and bring the *Earth* nearer to evenness and plainness.

Seeing then there are no hopes of Explaining the *Origin* of MOUNTAINS, either from *particular Earthquakes*, or from the General *Deluge*, according to the common notion and Explication of it; these not being *Causes* answerable to such vast *Effects*; let us try our *Hypothesis* again, which hath made us a *Channel* large enough for the Sea,

Sea, and room for all Subterraneous Cavities, and I think will find us Materials enough to raise all the MOUNTAINS of the Earth. We suppose the great Arch or Circumference of the first Earth to have fallen into the *Abyss* at the *Deluge*, and seeing that was larger than the *Surface* it fell upon, 'tis absolutely certain, that it could not all fall flat, or lie under the Water: Now, as all those parts that stood above the Water made dry Land, or the present Habitable Earth, so such parts of the dry Land as stood higher than the rest made *Hills* and MOUNTAINS; and this is the first and General Account of them, and of all the Inequalities of the Earth. *THO. BURNET's Theory of the Earth. Lib.* 1. *Cap. XI.*

The *Height* of MOUNTAINS compar'd with the *Diameter* of the *Earth* is not considerable, but the *Extent* of them and the Ground they stand upon, bears a conside-

rable proportion to the *Surface* of the *Earth*. And if from *Europe* we may take our Measures for the reſt, I eaſily believe, that the MOUNTAINS do at leaſt take up the Tenth part of the Dry Land. *Ibidem.*

The *Height* of the *higheſt* MOUNTAINS doth bear no greater a proportion to the *Diameter* of the *Earth*, than of the Sixteen Hundred and Seventieth *part* to the *whole*, ſuppoſing the *Diameter* of the *Earth* to be Eight Thouſand Three Hundred Fifty Five Miles, as *Pet. Gaſſendus* computes both. And it is more than probable, that Men have been exceedingly miſtaken, as to the *height* of MOUNTAINS, which comes ſo far ſhort of *Sir Walter Raleigh*'s Computation of *Thirty* Miles, that the Higheſt MOUNTAIN in the World will not be found to be *Five* direct Miles in *height*, taking the *Altitude* of them from the *plain* they ſtand upon. *Olympus*, whoſe Height

Height is so extoll'd by the *Poets* and Ancient *Greeks*, that it is said to exceed the *Clouds*, yet *Plutarch* tells us, that *Xenagoras* measur'd it, and found it not to exceed a Mile and a half *perpendicular*, and about 70 paces. Much about the same height *Pliny* saith that *Dicæarchus* found the Mountain *Pelion* to be. The Mount *Athos* is supposed of extraordinary height, because it casts its shadow into the *Isle* of *Lemnos*, which according to *Pliny* was 87 Miles; yet *Gassendus* allows it but *Two Miles* in height; but *Isaac Vossius* in a Learned Discourse concerning the height of MOUNTAINS, in his *Notes* on *Pomponius Mela*, does not allow above 10 or 11 *Furlongs* at most to the Height of Mount *Athos*. *Caucasus*, by *Ricciolus*, is said to be 51. Miles in height: *Gassendus* allowing it to be higher than *Athos* or *Olympus*, yet conceives it not above three or four Miles at most; but *Vossius* will not yield it above *Two*

Miles perpendicular, for which he gives this very good Reason; *Polibius* affirms, there is no MOUNTAIN in *Greece* which may not be ascended in a Days time, and makes the highest MOUNTAIN there not to exceed *Ten Furlongs*; Which, saith *Vossius*, it is scarce possible for any one to reach, unless he be a *Mountainer* born; any other will scarce be able to ascend above *Six Furlongs* perpendicular; for in the Ascent of a MOUNTAIN every *pace* doth reach but to an *hands breadth*, perpendicular; but if we do allow *Eight Furlongs* to a Days *Ascent*, yet thereby it will appear that the *Highest* MOUNTAINS in the World are not above *Twenty* four *Furlongs* in height, since they may be ascended in *Three Days* time: And it is affirmed of the top of Mount *Caucasus*, that it may be ascended in less than the compass of three Days, and therefore cannot be much above two Miles in height. Which may be the

the eaſier believ'd of any other *Mountain*, when that which is reputed the *higheſt* of the World, *viz.* the *Pike* of *Teneriffe*, which the Inhabitants call *Pica de Terraria*, may be aſcended in that compaſs of time, *viz. Three Days*; For in the Months of *July* and *Auguſt* (which are the only Months in which Men can aſcend it, becauſe all other times of the Year *Snow* lies upon it, although neither in the *Iſle* of *Teneriffe*, nor any other of the *Canary Iſlands*, there be *Snow* ever ſeen) the Inhabitants then aſcend to the top of it in *Three Days* time, which top of it is not *Pyramidal* but *plain*, from whence they gather ſome *Sulphureous Stones*, which are carried in great quantities into *Spain*. So that according to the proportion of *Eight Furlongs* to a Days journey, this *Pike* of *Teneriffe* will not exceed the Height of a *German Mile* perpendicular, as *Varenius* confeſſeth, than which he thinks likewiſe, that no *Mountain*

in the World is higher. For what *Pliny* ſpeaks of the *Alpes*, being *Fifty Miles* in height, muſt be underſtood not perpendicular, but in regard of the *Obliquity* of the *Aſcent* of it; ſo that he might account ſo much from the *Foot* of the *Alpes* to the top of them, and yet the *Alpes* in a *perpendicular* Line not come near the Height of a *German Mile*. *STILLINGFLEET's Orig. Sacr. Lib.* 3. *Cap.* 4. pag. 544, *&c.*

Mr. Muraltus of *Zurich* in a Letter to *Mr. Haak*, a Fellow of the *R. S.* concerning the *Icy* MOUNTAINS of *Helvetia*, call'd the GLETSCHER, gives him this Account.

The Higheſt ICY MOUNTAINS of *Helvetia* about *Valeſia* and *Auguſta*, in the Canton of *Bern*; about *Paminium* and *Tavetſch* of the *Rhætians*, are always ſeen cover'd with Snow. The Snow melted by the heat of the Summer, other Snow being ſain with-

in

in a little while after, is hardned into ICE, which by little and little, in a long tract of time, depurating it ſelf, turns into a *Stone*, not yielding in hardneſs and clearneſs to *Cryſtal*. Such *Stones* cloſely joyned and compacted together, compoſe a whole MOUNTAIN, and that a very firm one; though in Summer time the Country People have obſerv'd it to burſt aſunder with great cracking, *Thunder-like*: Which is alſo well known to *Hunters*, to their great coſt; for as much as ſuch Cracks and Openings, being by the Winds cover'd with *Snow*, are the Death of thoſe that paſs over them. *PHILOS. TRANSACT. Numb.* 49.

Monſieur *Juſtel* in an Enlargement upon this very Subject, ſays, that the ICY-MOUNTAIN call'd the GLETSCHER, is very high, and extends it ſelf every year more and more over the Neighbouring Meadows, by increments that make a great noiſe, and cracking. There

are

are great Holes and Caverns, which are made when the ICE burſts; which happens at all times, but eſpecially in the *Dog-days*. Hunters do there hang up their Game they take during the great heat, to make it keep ſweet by that means. Very little of the Surface melts in Summer, and all freezes again in the Night. When the Sun ſhineth, there is ſeen ſuch a variety of Colours as in a *Priſm*.

There is ſuch another MOUNTAIN near *Geneva*, and upon the *Alps*. A certain *Capucin* told Monſieur *Juſtel*, that he had been upon the higheſt of theſe MOUNTAINS with a Trader in *Cryſtal*, who having driven his hammer into one of theſe *Rocks*, and found it hollow and reſonant; made a hole into it, and thence drew forth a Subſtance like *Talk*; which to him was a ſign there was *Cryſtal*. After which, he made a great hole with Gunpowder, and found *Rock-Cryſtal* in

in it. *PHILOS. TRANSACT. Numb.* 100.

I have had the Curiosity to enquire of more than one *Traveller*, that had Visited the Famous *Pico* of *Tenarif*, (at whose upper part there are found scatter'd parcels of *Sulphur*, and divers manifest Tokens of a *Vulcan*) whether the *Sulphureous Steams* (that I suppos'd to be copious near the top of the *Mountain*) did not work upon the *Silver* they had in their Pockets, and discolour it: To which he answer'd, that 'twas no uncommon Observation, to find at Mens return from visiting the top of the Hill, that the *Money* they carried about them was blackn'd, and that he himself had particularly observ'd it to be so: Which might easily gain Credit with me, who have divers times made a Preparation of *Sulphur*, which even in the Cold, sends out exhalations so penetrant, that having for Tryals sake, put some pieces of Coyn (which ought not

not to be *Golden*) into a Leather Purſe, they were able, and that not in very many Minutes, to diſcolour manifeſtly the *Money*, in ſpight of the interpoſition of the Purſe, that contain'd it. But I had a more conſiderable inſtance of the Efficacy of the *Sulphureous* Expirations of the *Pico* of *Tenarif*, by a Sober Perſon, that is one of the Chief Directors of the Famous *East-India* Company of *London*; who, being queſtion'd by me about ſome Circumſtances of his Journey to viſit the top of that ſtupendious MOUNTAIN, anſwered me, that among other Effects the *Sulphureous* Air had upon him, (who is of a very fine Complexion) he found at his return to the bottom, that his light-colour'd hair had manifeſtly changed colour, and was in many places grown forked at the ends. *ROB. BOYLE's Experim. Diſc. of the Inſalubr. and Salubrity of the Air*, pag. 31, 32.

Though

Though there are some, who think MOUNTAINS to be a deformity to the *Earth*, as if they were either beat up by the *Flood*, or else cast up like so many heaps of Rubbish left at the Creation; yet, if well consider'd, they will be found as much to conduce to the Beauty and Conveniency of the *Universe*, as any of the other parts. Nature (saith *Pliny*) purposely framed them for many excellent uses; partly to tame the violence of greater *Rivers*, to strengthen certain joynts within the Veins and Bowels of the Earth, to break the force of the Seas inundation, and for the safety of the Earths Inhabitants, whether *Beasts*, or *Men*. That they make much for the protection of *Beasts*, the *Psalmist* testifies, *The Highest Hills are a refuge for the Wild Goats, and the Rocks for Conies.* The Kingly Prophet had likewise learnt the safety of *those* by his own experience, when *He* also was fain to make

a MOUNTAIN his Refuge from the fury of his Maſter *Saul*, who Perſecuted him in the *Wilderneſs*.

True indeed, ſuch Places as *theſe* keep their Neighbours poor, as being moſt barren, but yet they preſerve them ſafe, as being moſt ſtrong; witneſs our Unconquer'd *Wales*, and *Scotland*, whoſe greateſt protection hath been the natural ſtrength of their Country, ſo fortified with MOUNTAINS, that *theſe* have always been unto them ſure retreats from the Violence, and Oppreſſion of others. Wherefore a good Author doth rightly call them *Natures Bulwarks, caſt up at God Almighty's own Charges, the ſcorns and curbs of Victorious Armies*; which made the *Barbarians* in *Curtius* ſo confident of their own ſafety, when they were once retir'd to an inacceſſible MOUNTAIN, that when *Alexander's* Legate had brought them to a *Parley*, and perſwading them to yield, told them of his Maſters Victo-

Victories, what Seas and Wilderneſſes he had paſſed: They replied, that all that might be, but could *Alexander* flye too? Over the Seas he might have Ships, and over the Land Horſes, but he muſt have Wings before he could get up thither. Such ſafety did thoſe Barbarous Nations conceive in the MOUNTAINS whereunto they were retired. Certainly then ſuch uſeful parts were not the effect of Man's Sin, or produced by the Worlds Curſe, the *Flood*, but rather at the firſt Created by the Goodneſs and Providence of the Almighty. *WILKIN's World in the Moon*, pag. 114, 115, 116.

It may be objected, that the preſent Earth looks like a heap of Rubbiſh, and Ruines; and that there are no greater Examples of Confuſion in Nature than Mountains ſingly or jointly conſidered, and that there appear not the leaſt footſteps of any Art or Counſel either in the Figure and Shape, or Order

and

and Disposition of MOUNTAINS and ROCKS. Wherefore is is not likely they came so out of God's hands; who by the *Ancient Philosophers* is said ἀεὶ γεωμετρεῖν, and to make all things in Number, Weight, and Measure.

To which I answer, that the present face of the Earth, with all its MOUNTAINS, and *Hills*, its *Promontaries*, and *Rocks*, as rude and deformed as they appear, seems to me a very beautiful and pleasant Object, and with all that variety of *Hills*, and *Valleys*, and Inequalities far more grateful to behold, than a perfectly level Countrey without any rising or protuberancy to terminate the Sight: As any one that hath but seen the Isle of *Ely*, or any the like Countrey, must needs acknowledge. Neither is it only more pleasant to behold, but more commodious for habitation, which is so plain, that I need not spend time to prove it.

Secondly,

Secondly, A Land ſo diſtinguiſhed into MOUNTAINS, *Valleys*, and *Plains*, is alſo moſt convenient for the Entertainment of the various ſorts of *Animals*, which God hath Created, ſome whereof delight in Cold, ſome in Hot, ſome Moiſt and Watery, ſome in dry and upland Places, and ſome of them could neither find nor gather their proper food in different Regions. Some Beaſts and Birds we find live upon the higheſt tops of the *Alps*, and that all the Winter too, while they are conſtantly cover'd with Snow, as the *Ibex*, and *Rupicapra*, or *Chamois* among *Quadrupeds*, and *Lagopus* among Birds.

Thirdly, The MOUNTAINS are moſt proper for the putting forth of *Plants*; yielding the greateſt variety, and the moſt Luxuriant ſort of *Vegetables*, for the maintenance of the *Animals* proper to thoſe places, and for *Medicinal* Uſes; partly alſo for the Exerciſe and Delight of ſuch ingenious Per-

ſons as are addicted to ſearch out and collect thoſe Rarities, to Contemplate and Conſider their Forms and Natures, and to admire and Celebrate the Wiſdom of their Creator.

Fourthly, All manner of *Metals*, *Minerals*, and *Foſſils* if they could be generated in a level Earth, of which there is ſome queſtion, yet ſhould they be Dug or Mined for, the *Delfs* muſt neceſſarily be ſo flown with water, (which to drive and rid away no *Adits* or *Soughs* could be made, and I much doubt whether *Gins* would ſuffice) that it would be extreamly difficult and chargeable, if poſſible to work them at all. *JOH. RAY's Miſcell. Diſc. of the Diſſolut. of the World*, pag. 165, *&c.*

It is likely, if not certain, that all *Vallies* riſe by *atteration*, that is, by *Earth* continually brought down from the tops of MOUNTAINS by *Rains*, and *Snows*, whence all MOUNTAINS are become

come lower than they were formerly, and the *Valleys* riſen higher; ſo that in time all the MOUNTAINS (except the Rocky) will by great ſhoots of *Rain* be quite waſhed away, and the whole Earth levell'd: Whereof the ingenious Mr. *John Ray* in his *Obſervat. Topograph.* p. 8. gives us a very pertinent Confirmation from the Steeple of *Craich*, in the *Peak* of *Derbyſhire*, which in the Memory of ſome Old Men yet living, could not have been ſeen from a certain Hill lying between *Hopton*, and *Werksworth*, whereas now, not only the *Steeple*, but a great part of the *Body* of the *Church* may be ſeen thence; which without doubt comes to paſs by the *deterration* or ſinking of a Hill between the *Church*, and place of *View*. And I am told of juſt ſuch another Example of a Hill between *Sibbertoft* and *Haſleby* in *Northamptonſhire*, whence yet we may only infer, that the *Parts* of the *Earth* do change their Scituation, giving

as much Increaſe (in proportion) at one place, as it takes away at another, without any Augmentation, or Diminution in the whole. *PLOT of Stafford Chap.* 3. *Sect.* 11, 12.

Obſervations concerning VULCANO's, *or* SUBTERRANEAN FIRES.

THere are *Subterraneous* Cavities, which they call VOLCANO's, or Fiery Mountains; that belch out Flames, Smoke and Aſhes, and ſometimes great Stones and broken Rocks, and Lumps of Earth, or ſome Metallick mixture; and throw them to an incredible diſtance by the force of the *Eruption*. Theſe argue great vacuities in the Bowels of the Earth, and Magazines of Combuſtible Matter treaſur'd up in them. And as the *Exhalations* within theſe places muſt be copious, ſo they muſt lie in long

long Mines or Trains to do ſo great Execution, and to laſt ſo long. 'Tis ſcarce credible what is Reported concerning ſome *Eruptions* of VESUVIUS and ÆTNA. The *Eruptions* of VESUVIUS ſeem to be more frequent and leſs violent of late; the Flame and Smoak break out at the top of the Mountain, where they have eaten away the Ground, and made a great hollow, ſo as it looks at the top, when you ſtand upon the brims of it, like an *Amphitheater*, or like a great *Caldron*, about a Mile in Circumference, and the burning *Furnace* lies under it. The *outſide* of the *Mountain* is all ſpread with Aſhes, but the *inſide* much more; for you wade up to the mid-leg in Aſhes to go down to the bottom of the Cavity, and 'tis extreamly heavy and troubleſome to get up again. The *inſide* lies ſloping, and one may ſafely go down it if be not in a raging fit; but the *middle* part of it or *Center*, which is a

little rais'd like the bottom of a Platter, is not to be ventur'd upon, the Ground their lies falſe and hollow, there it always Smoaks, and here the *Funnel* is ſuppos'd to be; yet there is no viſible Hole or gaping any where when it doth not rage. *Naples* ſtands below in fear of this *Fiery Mountain*, which hath often cover'd its Streets and Pallaces with its Aſhes; and in ſight of the *Sea* (which lies by the ſide of them both) and as it were in defiance to it, threatens it at one time or another, to burn that fair City. *Hiſtory* tells us, that ſome Eruptions of VESUVIUS have carri'd Cinders and Aſhes as far as *Conſtantinople*; This is affetted both by *Greek* and *Latin Authors*; particularly *Ammianus Marcellinus* ſaith, that they were ſo affrighted with them, that the Emperor left the City, and that there was a Day obſerv'd Yearly in Memorial of it.

ÆTNA

ÆTNA is of greater Fame than VESUVIUS, and of greater Fury, all Antiquity ſpeaks of it; not only the *Greeks* and *Romans*, but as far as Hiſtory reacheth, either real or fabulous, there is ſomething recorded of the Fires of ÆTNA The Figure of the *Mountain* is inconſtant, by Reaſon of the great Conſumptions and Ruines it is Subject to; The Fires and Æſtuations of it are excellently deſcrib'd by *Virgil*, upon occaſion of *Æneas* his paſſing by thoſe Coaſts.

——*Horrificis juxta tonat ÆTNA ruinis;*
Interdumq; atram prorumpit ad æthera nubem,
Turbine fumantem peiceo & candente favillâ;
Attollitq; globas flammarum, & Sydera lambit;
Interdum ſcopulos, avulſaq; viſcera Montis
Erigit eructans, liquefactaq; Saxa ſub auras.

Cum gemitu glomerat, fundoque exæſtuat imo.

Fama eſt Enceladi Semuſtum fulmine Corpus
Urgeri mole hâc, ingentemq; inſuper ÆTNAM
Impoſitam, ruptis flammam expirare Caminis.
Et feſſum quoties mutet latus, intremere omnem
Murmure TRINACRIAM *&* *cælum ſubtexere fumo.*

——*ÆTNA whoſe ruines make a thunder;*
Sometimes a Cloud of Smoak in pitchy Curles,
Mingled with burning Aſhes, forth it hurles.
Or balls of flame, that ſcorch the Stars on high;
Or its own Bowels torn, throws in the Skie.

In

In its deep Cells under the Earth, a Store
Of Fire Materials, molten Stones, and Ore,
It gathers, then Spews out, and gathers more.
ENCELADUS *when Thunder-ſtruck by* JOVE,
Was buri'd here, and ÆTNA *thrown above;*

And when to change his wearied Side, he turns,
The ISLAND *trembles, and the* MOUNTAIN *burns.*

Not far from ÆTNA lies STROMBOLO, and other adjacent Iſlands, where there are alſo ſuch Magazines of Fire; and throughout all Regions and Countries, in the *Weſt-Indies* and in the *Eaſt*, in the Northern and Southern parts of the Earth, there are ſome of theſe VOLCANO's, which are ſenſible Evidences that the *Earth* is incompact and full of Caverns; beſides, the

the roarings and bellowings that uſe to be heard before an *Eruption* of theſe VOLCANO's, argue ſome dreadful hollowneſs in the belly or under the Roots of the *Mountain*, where the *Exhalations* ſtruggle before they can break their Priſon. *THO. BURNET's Theory of the* Earth, *Pag.* 117, *&c.*

I will not enter upon a long Deſcription of that which is ſo well known as Mount VESUVIO; it had roar'd ſo loud about a Month before I came to *Naples*, that at *Naples* they could hardly ſleep in the Nights, and ſome old Houſes were ſo ſhaken, by the *Earthquake* that was occaſion'd by this Convulſion of the Hill, that they fell to the Ground: And the laſt *Eruption*, above Fifty Years ago, was ſo terrible, that there was no ſmall fear in *Naples*, though it lies at the diſtance of Seven Miles from the Hill, yet the Storm was choaked under Ground.

When one ſees the Mouth of this Fire, and ſo great a part of the

the Hill which is cover'd ſome Foot deep with Aſhes and Stones of a Metallick Compoſition, that the Fire throws out, he cannot but ſtand amaz'd, and wonder what can be the Fuel of ſo laſting a Burning, that hath calcin'd ſo much matter, and ſpew'd out ſuch prodigious quantities. It is plain there are vaſt Veins of SULPHUR all along in this Soil, and it ſeems in this Mountain they run along through ſome Mines and Rocks, and as their ſlow Conſumption, produceth a perpetual Smoke, ſo when the Air within is ſo much rarified that it muſt open it ſelf, it throws up thoſe Maſſes of Mettle and Rock that ſhut it in; but how this Fire draws in Air to nouriſh its Flame, is not ſo eaſily apprehended; unleſs there is either a Conveyance of Air under Ground, by ſome undiſcover'd Vacuity; or a more inſenſible tranſmiſſion of Air, through the Pores of the Earth. The heat of this Hill operates ſo much upon the

the Soil that lies upon it toward the Foot of it, that it produceth the richeſt Wine about *Naples*; and it alſo purifieth the Air ſo much, that the Village at the bottom is thought the beſt Air of the Country, ſo that many come from *Naples* thither for their Health. *Iſchia* that is an Iſland not far from *Naples*, doth alſo ſometimes ſpew out Fire. *Dr. BURNET's Lett. Pag.* 174, 175.

The Hill ÆTNA now call'd MONT-GIBEL, is Ten Miles from the top to the bottom, and may be eaſily diſcern'd by Sailers at an Hundred Miles diſtance: The *lower* parts thereof are very Fruitful, the *middle* being ſhaded with Woods, and the *Top* cover'd with Snow, a great part of the Year, notwithſtanding the frequent Vomiting of Flames and Cinders. It was formerly obſerv'd, and to this Day the ſame Obſervation holds, That whenever any extraordinary *Eruption* happens, it certainly portends

tends ſome Revolution. But theſe *Eruptions* of Fire are not now ſo ordinary as formerly; the matter which gave Fuel to it, being waſted by continual Burnings: So that the Flames which iſſue from it are hardly viſible but by Night, tho' the Smoak ſhew it ſelf the moſt part of the Day. And when it doth break out, which is commonly once in three or Four Years, it falleth in great flakes on the *Vales* adjoyning, to the deſtruction of the Vintage, and great loſs of the Countrey. But that, they ſay, is recompens'd by the plenty of the following Years, the Aſhes thereof ſo enriching the Soil, that both the *Vines* and *Corn-Fields* are much better'd by it.

The Reaſon of theſe *Fires* is the Abundance of SULPHUR and BRIMSTONE, contain'd in the boſome of the Hill; which is blown by the Wind, driving in at the Chaps of the Earth, as by a pair of Bellows. Through theſe Chinks alſo

alſo there is continually more Fuel added to the Fire, the very Water adding to the force of it: As we ſee that Water caſt on Coals in the Smiths Forge, doth make them burn more ardently. *PET. HEI-LIN*'s Coſmogr.

Johannes Alphonſus Borellus in his *Hiſtoria and Meteorologia* INCENDII ÆTNÆI, *Anni* 1669, rejects the Opinion of thoſe, that maintain the ÆTNEAN Fires to have been perpetual and never extinguiſh'd, aſſerting the frequent Ceſſation of them, and withal aſſigning the Cauſe of that Ceſſation, as well as that of their Renovation. Concerning which, and many other conſiderable Remarks and Reflexions, too many to be here recited, we refer the Reader to the Book it ſelf.

Now, whether theſe *Eruptions* are cauſed by actual *Subterraneous Fires*, lighting upon Combuſtible Matter; Or by Fire ſtruck out of falling and breaking Stones, whoſe Sparks meet with *Nitro-Sulphureous*

or

or other inflamable Subſtance heap'd together in the Bowels of the Earth, and by the Expanſive violence of the *Fire* forc'd to take more room, and ſo burſting out with the impetuoſity we ſee; may not be unworthy of a *Philoſopher*'s Speculation. *PHILOS. TRANSACT. Numb.* 48. *Pag.* 969.

Naturaliſts affirm, that theſe VULCANO's or *Fiery Mountains* nouriſh SULPHUREOUS Matter in their Bowels which is eaſily inflam'd, and iſſues out with more or leſs Vehemency, and more or leſs frequency, according as the Matter is more or leſs diſpoſed; and the *Subterranean* Winds kindle and eject theſe *Fires*, and open the Maſs of Earth, under which they are ſhut up. But the Opinion of certain *Philoſophers*, who maintain, That meer Chance produces theſe extraordinary Events, appears to me very Ridiculous; affirming, that one *Stone* ſtriking another, produces a *Spark* whence happen theſe great

great *Inflammations*: Nay, they proceed farther, and would perſwade us, That a *Lighted Lamp*, left, by chance, by thoſe who ſearched into the Bowels of theſe *Mountains*, to diſcover the Secrets of Nature, might make theſe *Flames*; which lighting on a Combuſtible Matter, and meeting with nothing that is contrary to 'em to extinguiſh them, to cauſe theſe Surprizing Effects. They alſo ſay, That *Lightning* ſtriking fiercely on ſome one of the Coaſts on theſe *Mountains*, may do the ſame thing; as the *Stones* ſtriking one againſt another, or the *Lamp* left *Lighted*. *See LETTERS writ by a TURKISH SPY at* Paris, *Vol.* 1. *Pag.* 126, 127.

That Learned *Phyſician*, and moſt Sagacious Inquirer into Nature, *Dr. Martin Lyſter*, ſaith, That amongſt *Minerals*, the *Pyrities*, both in Groſs and in Vapour, is actually of its one accord fired. He inſtances the VULCANO's all the World over

over for a proof of it; for, *ſaith he*, we with great probability believe *them* to be *Mountains* made up in great part of *Pyrites* (the Breath whereof is SULPHUR *Ex tota Subſtantia*,) by the qualities of SULPHUR thence Sublimed, and the Application of the *Load-Stone* to the Ejected Cinder. And he proceeds, telling us, That theſe VULCANO's were naturally kindled of themſelves, at or near the Creation, in all probability, becauſe there is but a certain known Number of them, which have all continued burning beyond the *Memoirs* of any *Hiſtory*, few or none of them that he knows of, have ever totally decay'd or been extinct, unleſs poſſibly by the Submerſion of the whole, being abſorpt in the Sea. Though they indeed, do burn more fiercely ſometimes than at others, for other Reaſons. So that it ſeems to me, ſaith the *Doctor*, as natural to have actual *Fire* in the *Terreſtrial*

World from the Creation, as to have *Sea* and *Water*.

Again, ſaith the *Doctor*, if theſe VULCANO's did not kindle of themſelves, what cauſe can we imagine to have done it? If the Sun; we anſwer, *Hecla* placed in ſo extream Cold a Climate was kindled, for ought I can ſee by the *Natural Hiſtory* of both, as ſoon as ÆTNA, or FUEGOS, or the moſt *Southerly*. Not the Accidents hapning from *Man*; for, if *Man* was (as we muſt believe) created Solitary and Topical, they were none of his kindling, becauſe they ſeem to be fired before the World could be all over Peopled; beſides, they were moſtly the very Tops of vaſt high *Mountains*, and therefore the moſt unfit for the Habitation of Man. *MART. LISTER in the PHILOS. TRANSACT.* 157. pag. 516.

Obſer-

Obſervations concerning EARTHQUAKES.

EARTHQUAKES are too evident Demonſtrations of the Hollowneſs of the Earth, being the dreadful Effects or Conſequences of it; for if the Body of the Earth was ſound and compact, there would be no ſuch thing in Nature as an EARTHQUAKE. They are commonly accompanied with an heavy dead Sound, like a dull Thunder, which ariſeth from the *Vapours*, that are ſtriving in the Womb of Nature when her Throes are coming upon her. And that theſe *Caverns* where the *Vapours* lie are very large and capacious, we are taught ſometimes by ſad Experience; for whole Cities and Countries have been ſwallow'd up into them, as *Sodom* and *Gomorrah*, and the Region of *Pentapolis*, and ſeveral Cities in *Greece*, and in *Aſia*, and other parts.

Whole *Islands* also have been thus absorpt in an EARTHQUAKE; the pillars and props they stood upon being broken, they have sunk and fain, in as an House blown up. I am also of Opinion, that those *Islands* that are made by divulsion from a *Continent*, as *Sicily* was broken off from *Italy*, and great *Britain*, as some think, from *France*, have been made the same way; that is, the *Isthmus* or Necks of Land that joyn'd these *Islands* with their *Continents* before, have been hollow, and being either worn by the Water, or shak'd by an EARTHQUAKE, have sunk down, and so made way for the *Sea* to overflow them, and of a *Promontory* to make an *Island*.

For it is not at all likely, that the Neck of Land continu'd standing, and the *Sea* overflow'd it, and so made an *Island*; for then all those Passages between such *Islands*, and their respective *Continents*, would be extreamly shallow and unnavigable

gable, which we do not find them to be. Nor is it any more wonder, if such a Neck of Land should fall, than that a Mountain should sink, or any other Tract of Land, and a Lake rise in its place, which hath often happen'd. *Plato* supposeth his *Atlantis* to have been greater than *Asia* and *Africa* together, and yet to have sunk all into the *Sea*; whether that be true or no, I do not think it impossible that some Arms of the *Sea* or *Sinus*'s might have had such an Original as that; and I am very apt to think, that for some Years after the *Deluge*, till the Fragments were well settled and adjusted, great alterations wou'd happen as to the Face of the *Sea* and the *Land*; many of the Fragments would change their posture, and many would sink into the Water that stood out before, the props failing that bore them up, or the Joynts and Corners whereby they lean'd upon one another; and thereupon a new Face of Things

would ariſe, and a new *Deluge* for that part of the Earth. Such removes and interchanges, I believe, would often happen in the firſt Ages after the *Flood*; as we ſee in all other Ruines there happen leſſer and Secondary Ruines after the firſt, till the parts be ſo well pois'd and ſettled, that without ſome violence they ſcarce change their poſture any more.

But to return to our EARTHQUAKES, and to give an inſtance or two of their Extent and Violence: *Pliny* mentions one in the Reign of *Tiberius Cæſar* that ſtruck down Twelve Cities of *Aſia* in one Night. And *Fournier* gives us an Account of one in *Peru*, that reach'd Three Hundred Leagues along the *Sea-Shore*, and Seventy Leagues Inland; and levell'd the *Mountains* all along as it went, threw down the Cities, turn'd the Rivers out of their Channels, and made an Univerſal havock and Confuſion; And all this, *he ſaith*,

was

was done within the ſpace of Seven or Eight Minutes. There muſt be dreadful Vaults and Mines under that *Continent*, that gave paſſage to the *Vapours*, and liberty to play for Nine Hundred Miles in length, and above Two Hundred in breadth. *Aſia* alſo hath been very ſubject to theſe Deſolations by EARTH-QUAKES; and many parts in *Europe*, as *Greece*, *Italy*, and others. The Truth is, our Cities are built upon Ruines, and our Fields and Countries ſtand upon broken Arches and Vaults, and ſo does the greateſt part of the outward Frame of the Earth, and therefore it is no wonder if it be often ſhaken; there being quantities of *Exhalations* within theſe Mines, or Cavernous paſſages, that are capable of rariſaction and inflamation; and upon ſuch Occaſions, requiring more room, they ſhake or break the Ground that covers them. *THO. BURNET's*

Theory of the Earth. Pag. 119, 120, 121.

Many have written of the Cauſes of theſe dreadful Effects of Nature, of theſe Tremblings and Shiverings of the *Earth*, or rather *Aguiſh* ſhaking Fits, whereunto we find *her* Body is as ſubject as the Body of *Men*, or *Lions*, who are obſerv'd to have their *Month*, *Paroxiſmes*.

The *Babilonian Philoſophers* think the Cauſe of theſe impetuous Motions happeneth by the force of ſome *Planet* meeting with the Sun in the Region of the Earth; *Others* hold it to be a *Vapour* a long time engendring in ſome Concavities of the *Earth*, and reſtrain'd from Sallying forth into the Air; *Others* affirm, that it is a *Wind* penn'd up in the Entrails of the Earth; *Pliny* ſays, that the Earth never *quaketh*, but when the *Sea* is very Calm, and the *Air* ſo ſtill and clear, as the *Birds* can hardly bear themſelves up, and that the *Winds* are then

then ſhut up in the Bowels of the *Earth*, their improper Station. *He* addeth further, that an EARTHQUAKE is nothing elſe but as *Thunder* in the *Air*, or an overture and Crevice in the *Earth*, or as *Lightning* breaking forth violently and making irruptions from the midſt of the Clouds, the Wind inclos'd therein, and ſtruggling to come forth by force. The *Stoicks* ſpeak of divers Sorts of EARTHQUAKES that cauſe the gapings of the *Earth*, the ſwellings of the Water, and boiling of the ſame; a horrid confus'd Sound commonly proceedeth and accompanieth this *Quaking*, ſometimes like to the roaring of a *Bull*, ſometimes to the lamentable Cry of ſome Humane Creature, or like the Clattering of Armour, according to the quality of the *Matter* which is inclos'd, or according to the Form of the *Cave*, and Hole, or SPELUNCA, through which it paſſeth, which reſounds in Vaulty and hollow places: It waxeth

eth hot, in ſharp and dry places and cauſeth defluxions in thoſe that are moiſt and humid. Now amongſt all EARTHQUAKES, the Agitation of the Waters is moſt dangerous, for Lightning is not ſo hurtful, nor the ſhaking of Buildings, or when the Earth is puff'd up, or falleth down by an interchangeable Motion, becauſe the one keepeth back the other. The ſafeſt Buildings are thoſe upon *Vaults*, the Corners of Walls, and on Bridges leaning one againſt another; beſide, Brick Buildings are leſs dangerous in ſuch Accidents. Your skilful *Navigators* can foretel theſe EARTHQUAKES, at ſuch time as they perceive the Waves to ſwell on a ſudden without a Wind; and likewiſe thoſe on Land may alſo foretel them, when they behold *Birds* in a maze to ſtay their flight; or when Waters in Wells are troubled more than ordinary, having a bad unſavoury ſmell: All theſe are Preſages of ſuch

ſuch hidious Motions: *Pherecydes* the *Syrian* drawing Water out of a Well, foretold an EARTHQUAKE; and ſo did *Anaximander Mileſius*; And the trueſt Signs are, *either* when the *Wind* blows not; *Or* when the *Sea* and Region of the *Air* are Calm, for an EARTHQUAKE never happeneth, when the *Wind* blows, or the *Sea* ſwells. *JAMES HOWELL's Hiſt. of* Venice, *Pag.* 75, 76.

If we may Credit *Ariſtotle*, he tells us that EARTHQUAKES are moſt frequent in *Spring* and *Autumn*; which remark, though ſlighted by *Gaſſendus*, who generally affects to contradict that *Philoſopher*, is notwithſtanding confirm'd by that great Naturaliſt *Pliny*, and ſeveral other Learned Men in all Ages; who do not deny but that EARTHQUAKES may, and have ſeveral times happened both in *Summer* and *Winter*, tho' not ſo commonly as in the other Two *Seaſons*, in which there is generally

generally a greater abundance of *Moisture* sucked up, more *Vapours* and a larger quantity of *Nitre*, as Experience doth demonstrate, all which *Ingredients* may conspire to the producing of an EARTHQUAKE. For if we consider, how capable they are of a large Expansion, how forcible they are when rarified in *Vessels* closed, and placed over the *Fire*; in *Æolypiles*, or vents, from which they break out, with forcible Blasts, or in Winds, which frequently proceed from the rarifaction of such Principles, we may suppose that those *Vapours*, which produce such great Commotions in the *Air*, may cause a considerable Disturbance in the *Earth*, when pent and *locked* up by *Cold*, or any such like Accident.

It is generally observ'd, that some little time before an EARTHQUAKE, there is not only a great *Calmness*, but likewise a sudden *Coldness* and *Chillness* in the *Air*; which was observ'd just before

fore the EARTHQUAKE that happen'd at *Oxford*, and the parts adjacent *Sept.* 17. 1683. And the like Observations of *Cold* preceeding are in *Dr. Wallis*'s Account of an EARTHQUAKE, *Numb.* 10. of the *Philosophical Transactions*, as also in that of *Mr. Boyle*, *Numb. XI.* concerning the same EARTHQUAKE. *THOMAS PIGOT*'s *Account of the EARTHQUAKE at* Oxford, *&c. Sept.* 17. 1683. *in the PHILOS. TRANSACT. Numb.* 151. *Pag.* 312, 313.

In EARTHQUAKES the *tremulous Motion* sometimes extends so very far, that, tho' it seems highly probable that the *Shake* that is given to one part of the *Earth* by the *Firing* and *Explosion* of *Subterraneal Exhalations*, (if that be the true and only cause of EARTHQUAKES) is not capable of reaching near so far as divers EARTHQUAKES have done, but that the *Fire* passes through some little *Subterraneal* Clefts, or Channels, or hidden

hidden Conveyances, from one great Cavity or Mine to another; yet 'tis not improbable, but that the *vehemently tremulous Motion* does oftentimes reach a very great way beyond the places where the *Exploſions* were made. Since, tho' *Seneca* would confine the Extent of EARTHQUAKES to two Hundred Miles, yet Obſervations made in this and the laſt Century warrant us to allow them a far greater ſpread.

The Learned *Joſephus Acoſta* affirms, that in the Kingdom of *Peru*, in the Year 1586. an EARTHQUAKE reached along the Shoar of the *Pacifick* Sea 160 Leagues; And adds, that ſometimes it has in thoſe parts run on from South to North 300 Leagues. And in the beginning of this our Age (*Anno Dom.* 1601) good Writers relate a much larger EARTHQUAKE to have happened, ſince it reached from *Aſia* to that *Sea* that waſhes the *French* Shoars, and, beſides ſome

ſome *Aſiatick* Regions, ſhook *Hungary*, *Germany*, *Italy* and *France*, and conſequently a great part of *Europe*. And if that part of the Narrative be certain, which relates, that this laſted not much above a quarter of an Hour, it will be the more likely, that this EARTHQUAKE ſhook great Tracts of Land beyond thoſe places, to which the *fired Matter*, paſſing from one Cavity to another, could reach in ſo ſhort a time: As you will the more eaſily gueſs, if you try, as I have done, that in Trains of *Gunpowder* it ſelf, the *Fire* does not run on near ſo ſwiftly as one imagines. *ROB. BOYLE of the great Effects of even LANGUID MOTION, Pag.* 49, 50, 51.

Obſer-

Observations concerning HURRICANES.

HURRICANES by some are call'd HURACANOS, and by others, ORANCAN. In some of the CARIBBE ISLANDS the Word HURRICA signifies the DEVIL, whence the Tempest took its Name, it being commonly call'd in *Latine* TEMPESTAS DIABOLICA.

We seldom hear of any HURRICANES but between the TROPIQUES, and within the Jurisdiction of the *General*, or *Trade*-Wind; which blowing perpetually from the *Eastern Points*, if it chance to be repell'd by a *Land-Brise*, or any contrary Motion from the *West*; This must needs occasion strange *Conflicts* and *Seditions* in the *Air*: And, were our Senses fine enough to discern the invisible Commotions of the *Atmosphere*, we should see it oftentimes disturb'd and *Fluctuating*,

Fluctuating, no leſs than the moſt *Tempeſtuous Seas*.

Theſe HURRICANES are not alike terrrible in all places between the TROPIQUES, but Reign more eſpecially near High Shoars and Iſlands that lie *Eaſtward* from the *Continent*; ſo that they infeſt the *Philippine* and *Caribbe-Iſles*, more than any other parts of the Habitable World.

It ſeems to me very odd, that theſe HURRICANES ſhould be ſo dreadful in ſome places of the *Caribbe-Iſlands*, inſomuch that *Mevis* and *St Chriſtophers*, have ſeveral times been almoſt depopulated by them, when they never reach to *Jamaica*, on the *one ſide*, (happily as lying without the *Vortex* of the Whirlwind) nor *on the other*, beyond *Barbadoes*, where they have ſeldom more than the Tail of an HURRICANE, though it is not far Scituate from *St. Chriſtophers*, *Porto Rico*, *Cardaloupe*, and other Iſlands,

where they rage with the greateſt Violence.

HURRICANES are no ſtrangers to the *Moluccas*, and *Philippines*, and we have moſt incredible Relations of the Storms in the way to *Japan*, which have carried Ships a conſiderable diſtance from the *Sea*, up the *Dry-Land*: Some have been miſerably wrackt, and buried in the Waves, others ſplit in a Thouſand pieces againſt the Rocks, that ſcarce one Ship in five eſcapes theſe Diſaſters in the Tempeſtuous Months about *Autumn*, or at the Change of the *Monſoons*. From thence we may collect this *Conſiderable Remarque*, That they never happen but on the *Eaſtern Shoars*, where they are Fatal to the *Chineſe* and *Caribbee-Seas*, and ſo as far as the River of *Plate*; likewiſe to that part of *Afric* from the *Cape* to St *Lawrence*, and the Adjacent Iſles: When they are altogether unknown to the *African Ocean*, from the *Canaries* to *Cape Bon Eſperance*,

rance, nor are they ever heard of at *New-Spain*, or the Coaſts of *Peru*, nor towards any other *Weſtern* parts of *America*, becauſe there the Winds, which blow off from *Land*, make no Oppoſition againſt the *General Briſe*, but comply with the conſtant Motion of the *Air* between the *Tropiques*, from *Eaſt* to *Weſt*: For the ſhifting of the *Trade-Wind* from the *Eaſterly Points*, is uſually the firſt *Onſet* of an approaching HURRICANE.

Yet, however theſe Suſpicions of Mine be receiv'd, I think it cannot be rationally diſputed, but that thoſe direful Tempeſts have their firſt Riſe from the *Weſtern Continent*: For we ſeldom meet them very remote from *Land*, and the Experienc'd Maſters of Ships are never jealous of HURRICANES in the *Spacious Ocean*; Or, if they perceive them coming, imediately make out to *Sea*, where their Fury is much *leſs*, than near the *Shoars*.

HURRICANES are moſt to be dreaded about the end of *Summer*, in the Months of *July* and *Auguſt*: For both the *Winds* and *Seas* imitate the Motions of the *Sun*, and being dilated by the *Celeſtial Heat*, annually *revert* from *North* to *South*; and from *South* to *North* again; So that the *Sun* haſtening from one *Tropique* to another, cauſes the like ſuddain *Converſions* in the *Currents* and *Winds*; and being the moſt *Univerſal Efficient*, muſt needs be principally concern'd in all Viciſſitudes of the *Sublunary World*.

HURRICANES are uſually preceeded by an extraordinary *Tranquillity* of the Heavens and Seas: Poſſibly, ſome *Counter-Winds* may for a ſhort ſpace ballance one another, and bring the *Air* to an *equal poiſe*. So that, thoſe who happen to be in the Center of the *Whirl-Wind* are at firſt ſenſible of no diſturbance; as we ſee in *Eddys* or *Whirl-Poo's* of Water, that, while the Circumference is violently

lently agitated, in the middle it continues for some time quiet and calm. *R. BOHUN's Disc. of the ORIGINE and PROPERTIES of WIND, Pag.* 255, 256, *&c.*

This following Account of the Nature of HURRICANES, is given us by an Ingenious *Frenchman*, in his History of the *Caribbe-Islands*; quoted by the aforesaid *Mr. Bohun, Pag.* 280, 281, *&c.*

"HURRICANES are terrible and "violent Tempests, which may be "term'd the true Images of the "last Conflagration of the World: "Formerly they happen'd but once "in Five or Seven Years; but they "are now become more frequent, "since the *Antilles* were inhabited, "for there was One in 51, ano-"ther in 52, Two in 53, and Two "in 56: (Nay, in the Islands of "*Gardaloupe*, lying about the 16 "degree of *N. Latitude*, there hap-"pen'd no less than three HURRI-"CANES in one Year.) The Man-"ner of them is, as followeth.

"Ordinarily the *Sea* becomes "*Calm* on a ſudden, and ſmooth as "Glaſs: Then preſently after, the "*Air* is *Darkned*, and fill'd with "thick and gloomy Clouds; after "which, it's all (as it were) on "Fire, and opens on every ſide with "dreadful *Lightnings*, that laſt a "conſiderable time: After which "follow wonderful Claps of *Thun-*"*der*, that ſeem as if the Heaven "was rent aſunder.

"The Earth *trembles* in many "places, and the Wind blows with "ſo great Impetuoſity, that it "Roots up the talleſt and greateſt "Trees which grow in the Woods; "beats down almoſt all the Houſes, "and tears up the *Vegetables*; de-"ſtroying every thing that grows "upon the Earth; and very often "compels Men, whilſt this dread-"ful Tempeſt laſts, to catch hold "of the Trunks of Trees, to ſecure "themſelves from being carried a-"way by the Winds; ſome lye in "the Caves of the Rocks, or retire

"into

" into the Huts of the *Negroes* and " *Caribbians*, which are built ex- " ceeding low on purpoſe to elude " the Shocks of theſe Tempeſts.

" But that which is moſt dan- " gerous of all, and which cauſes " the greateſt Miſchief, is, that in " Four and Twenty Hours, and " ſometimes in leſs ſpace, it makes " the *whole Circle* of the *Compaſs*; " leaving neither Road nor Haven " ſecure from its raging force; ſo " that all the Ships that are at that " time on the Coaſt, do periſh moſt " Miſerably.

" At the *Iſland* of *St. Chriſtophers*, " ſeveral Ships in the Harbour, " being laden with *Tobacco*, were " all caſt away by an HURRI- " CAN; and afterwards the *To-* " *bacco* poyſon'd moſt of the Fiſh " on their Coaſts.

" When theſe Storms are over, a " Man may behold the ſaddeſt " Spectacles that can be imagin'd. " There may be ſeen Pieces of " Mountains ſhaken by the Earth-

" quakes, and Forrests overturn'd; " Houses beaten down by the Vio- " lence of the Winds; abundance " of poor Families undone by the " loss of their Goods, and the Mer- " chandize in their Cottages; of " which they can save but very " little. There one may see the " poor Sea-Men drown'd, and row- " ing in the Waves, with many " brave Ships broken in pieces, and " batter'd against the Rocks. 'Tis a " thing so Woful and Deplorable, " that should this Disorder happen " often, I know not who could " have the Heart or Confidence to " go to the *Indies*.

A Letter

A Letter from a *Sea-Captain*, to Mr. *R. BOHUN.*

SIR.

IN *Anſwer to your Requeſt, concerning* the HURRICANE, *I can ſay little of its Effects more, than what concerns our particular dammage, and terrour. It happen'd upon the* 18th *of* Auguſt *laſt* (1670) *Sixteen Hours after the New-Moon, in the* 14th *Degree of North Latitude, about Ninety Leagues from* Barbadoes; *It ſucceeded a Storm of* 48 *Hours continuance at North-Eaſt; an unuſual way of its appearing, for it commonly follows a* Calm: *Its preſage being a ſhifting of the Wind about the Compaſs, with the Appearance of a troubled Sky, the only advantage we have to prepare for its reception. The Fury of it began about* 10 *at Night, and continu'd till* 12 *the next Day. I'ts obſerv'd that the* HURRICANES *of the* New-Moon *begin at* Night, *and*

thoſe

thoſe at the Full *in the* Day; *as was noted two Years ſince, when the Lord* Willoughby *periſht with Eight Ships, and near a Thouſand Perſons.*

During its 14 *Hours Fury with us, it ſhifted* 14 *Points, from the* N. E. *to the* S. S. *Weſt, keeping a Method of Changing* One Point *an* Hour; *and then ſhifted backward, and in its retreat ſtill abated, until it returned to the Original Point, where it wholly ceas'd.*

In the height of it, we had ſome Hail, the Stones whereof were very great, which ſeem'd to be thrown upon us for the ſpace of the twentieth part of a Minute, and then an intermiſſion of Five or Six Minutes, before any more came. The Sea in the Night ſeem'd as a real Fire, *and I believe we might have diſtinctly perceiv'd any Object at a great diſtance: In the day time we ſeem'd rather to Sail in the Air than Water, the Wind forcing the Sea ſo high that we could ſcarce make a diſtinction of either Element.*

The

The Terrour of it was such, that I thought it the Emblem of Hell, and the last Dissolution of all things; especially the first two Hours, which were attended with so much Thunder, and Lightning, so astonishing, as if we had been wrapt up into the Clouds, or the whole Air set on Fire. The strength of the Wind was so great, that it blew a Boat of 18 *Foot long (fastned to four Ring-bolts, and each bolt through a Ring of the Ship) clear off the Deck: It blew away a piece of Timber of great Substance and Weight, called the Cross-Piece of the Bits, to which we fasten our Cables: It tore off the Sails from the Yards, though fast furled; the Yards from the Masts, and the upper Masts from the lower: It blew away four Men of Five, who were upon the Fore-Yard, three of which, by a Strange Providence, were thrown in again upon the Deck by the Sea, and saved. The last remain of its Fury was a Weighty Grinding Stone, which it left fastned between*

between two Timber Heads, but it blew away the Trough from under it. I had ſeveral Accounts from Particular Friends how terrible it was in other places, but to me it ſeem'd beyond all Expreſſion.

Theſe HURRICANES *are moſt frequent between the* ÆQUINOCTIAL, *and the Tropique of* CANCER: *They more rarely happen betwen the* LINE *and the Tropique of* CAPRICORN. *But that which to me is the greateſt Wonder, is, that they ſhould be ſo terrible among the Caribbe-Iſlands, that, in ſome of them, they have neither left Houſe, Tree, nor Plant in the Ground, beginning at* St. JOHN De Porto Rico, *and ſo running Eaſtward: but the* ISLANDS *of* HISPANIOLA, CUBA; *and* JAMAICA *are never troubled with them, though within few Leagues of the Reſt.*

There are ſome Old INDIANS *that have given notice of them three or four Days before their Coming: By what Rules, I was never curious*

to

to underſtand; It being enough for us to ſtudy how to defend our ſelves and Ships from them, rather than by any nice Enquiries to ſearch into their Cauſes: Only thus much I obſerv'd, that they have an influence upon the SEA, *as well as the* MOON, *both upon them and it; for I found by Obſervation of the* SUN *and* STARS, *that there was a Current tending ſo violently* Northward, *that in* 24 *Hours it would force us as many Leagues from our* Eaſterly *Courſe; which did ſo confound us, having neither Card nor Compaſs left to Steer by (which, with ſeveral other Goods, were ſwept away in a Breach which the* SEA *made into our Ship) that I think it was as great a difficulty for me to find out* BARBADOS *(this place being neareſt for our relief) as* COLUMBUS, *who firſt diſcover'd thoſe Countries. Sir, I have been as modeſt as I could in giving you this Relation, becauſe I know many who are acquainted with the violence of theſe Tempeſts,*

Tempests, will be incredulous; But I should be sorry, that all who will not believe this Account, should have the same Confirmation which I had. If there be any thing in it worth your notice, it may engage me hereafter to recollect some more Particulars; In all things I shall endeavour to assure you that I am, &c.

Were it not sufficient, that a Relation much of this Nature was presented to his *Majesty*; and that the Ship, after it return'd, lay at Anchor a long time in the River of *Thames*; not without Signal Marks of the HURRICANE, I might have been scrupulous enough, to have desir'd the Subscriptions of several others, who could attest the Truth of this Narrative. I should only wish that some of those *Reflections*, which the Ingenious *Captain* is pleas'd to make upon this Occasion, were enquir'd into, by those who live in any of the *Caribbe-Islands*: Whether the HURRICANES

RICANES of the NEW-MOON begin conſtantly by *Night*, and thoſe at the Full in the *Day*? Which would be remarkable, tho' I never remember to have met with the like Obſervation in any other Deſcription: However, we can by no means exclude the Operations of this Influential Planet; which has a very great Dominion over both the Winds and Tydes; whether from its *Preſſure*, or by what means ſoever it produces theſe Effects: Some have thought that the MOON has an *Atmoſphere* of its own, and ſends out *Effluvium's* to the Neighbouring World; and therefore acts more powerfully in the *Perigæum*, when it approaches neareſt the *Earth*.

That wonderful *Light* which appear'd during this HURRICANE, might be from the Colliſion of the *Lucid Salts*, with which the Sea-Water is ſo deeply impregnated: *Light* happily being nothing elſe but

but *the Motion of some Subtil Matter.*——

Not only the *Winds*, but the *Currents* are observ'd to change, and run round in *Eddys*, before the beginning of the Tempest.——It's likewise esteem'd a sure *Prognostique*, that the *Birds* (led by an instinct of Nature) come down before hand in Flocks from the *Mountains*, to secure themselves in the *Vallies* against the injury of the Weather.

I believe, there might be excellent use made of the *Barometer* for predicting of HURRICANES, and other Tempests, especially at Sea; since I am credibly inform'd, that a Person of Quality, who lives by the Sea-side, (though happily there may not be so considerable Alterations in the gravity of the *Atmosphere* far off at Land) can by the *Barometer* almost infallibly foretel any great Tempest for several Hours before it begins.

I find

I find no mention of *Salt-Rains* in any of the *Engliſh* Narratives; but the moſt Inquiſitive of the *French* and *Dutch* have reckon'd it as a very infallible Preſage, that the *Rain*, which falls a little before, is bitter, and Salt as the Sea-Water: Which happily may argue a Collection of ſome *Saline* and *Sulphureous* Spirits, in the Regions of the Air, that encountring each other, may by their violent Diſploſion be principally concern'd in the Production of HURRICANES. *R. BOHUN, Ibid.*

Dr. Stubbes ſays, that he had enquir'd of ſome, that had been in HURRICANES, if it were ſo Cold then, as *Vincent le Blanc* relates it? They ſaid, they had not found it to be ſo Cold; but yet in Compariſon of other times, it was much colder then. *He* alſo enquired of the Nature of thoſe Tempeſts, whether the Wind varied all the Points of the COMPASS as 'tis ſaid? They anſwer'd, No; but it

began always with a North-Wind, and when it came EAST, it ceas'd: But betwixt the NORTH and EAST-Point it varied so fast, and with such a violent Gust always, that it was impossible for any Ship in the Water to answer the *Veering* of the *Wind*. *PHILOS. TRANSACT. Numb.* 36. *Pag.* 706.

Observations concerning the TORNADOS.

THE TORNADOS are variable Winds, call'd in the *Portugal* Language TRAVADOS, but most significantly by the *Greeks* ECNAPHIAS from Νέφος *Nubes*; for their surest Prognostique is a *Thick Cloud*, suddenly rising above the *Horizon*, which is easily visible in those Countries, where the Air is generally defecate and serene. The *Cloud* for its smalness at first was call'd *Olho de Boy*, the *Bull's-Eye*; yet this, from so insensible a beginning,

ning, diffuſes it ſelf by degrees, and at laſt, covering the whole Face of the Heavens with a Canopy of Darkneſs, cauſes horrible Storms, *Thunder* and *Lightning*, ſwells the raging Seas up to the Clouds, which pour them down in Deluges of Rain, falling rather in huge *Caſcades*, and by Buckets-full, than Drops; ſometimes together with Hailſtones of prodigious bulk: So variable and unſteady are the TORNADO-Winds, ſo little obliged to any certain Law, that they commonly ſhift all the *Points* of the *Compaſs* in the ſpace of an hour, blowing in ſuch ſudden and impetuous Gufts, that a Ship which was ready to overſet on one ſide, is no leſs dangerous aſſaulted on the other; ſometimes they ſhift without intermiſſion, and otherwhile they blow in Starts, ſo that you ſhall have a perfect Calm between every puff: Let a Fleet of Ships ſail as near as they can without falling foul on each other,

and they ſhall have ſeveral and contrary Winds: You ſhall be allarm'd with many of them in the ſame Day, moſt towards the Coaſts of *Africk*, for half an hour or three quarters at a time: And were they equally laſting, as impetuous, few would be invited thither by the *Guiny* Gold, or venture to croſs the *Line* for the richeſt Merchandiſe of the *Eaſt*.

Our *Sea-Men* commonly meet with the TORNADOS from the 10*th* ſometimes the 11*th* and 12*th* *Degree* of *Northern Latitude*, likewiſe in the *Tropick* of *Capricorn* near the *Promontory* of *Cape Bon Eſperance*; where the *Fatal Cloud* riſes as only a ſmall *Spot* in the Air, and then diſplays it ſelf, ſpreading like a Carpet or'e the top of the Mountain; which the *Sea-Men* eſpying, though in the *Calmeſt Weather*, immediately furle their Sails, and provide for the enſuing Storm, that not long after deſcends in *Lightning* and *Winds*, being the more

more terrible becauſe it begins with the utmoſt Fury at firſt, and the Changes of the *Points* ſudden, as the twinckling of an Eye. You ſhall have a *treacherous Calm*, a dreadful *Tempeſt*, and in an hours ſpace the Sky *clear* again, and the Sea *Smooth* as Glaſs: The *Portugueſe* in their Diſcoveries of the *Oriental Indies*, loſt *Nine* Ships out of *Twelve*, which was overſet by the Prodigious Impetuoſity of theſe ſudden Guſts. But we ſeldom hear of ſuch Diſaſters now adays, our *Seamen* being more expert to govern themſelves, in theſe Dangerous Attacks; and always jealous of Surprize in the *African* Seas: „ For the nearer you are to the „ Coaſts of *Africk* (as was obſerv'd „ by an Inquiſitive Traveller of „ late, in the *Philoſophical Tranſacti-* „ *ons*, *Numb.* 50. *Pag.* 1004.) ſo „ much more dreadful is the *Thun-* „ *der* and *Rain*; but the further „ *Weſtward* you go, the *Thunder* „ and *Rain* will be leſs, and the

„ *Winds* not ſo uncertain; ſo that, „ if you go as far *Weſt*, as the *Me-* „ *ridian* of the *Eaſt* ſide of *Braſile*, „ there is little *Thunder*, neither „ doth the *Wind* come down in „ ſuch ſudden Puffs and Flaws; but „ between the 4 and 8 Degree, it „ is moſt inclin'd to *Calms* and thick „ *Foggs*, and the *Rains* come not in „ ſuch dangerous Showers.

I have not only conſulted the moſt Experienc'd of our *Sea-Men*, from whom I had information in theſe Particulars; but I find that many others, both *Engliſh* and *Forreigners*, have in their *Travels* given us Deſcriptions of the TORNADOS, which would be Superfluous to recite; I ſhall only add a Relation out of *Sir Thomas Roe* (in his *Eaſt-India Voyage*) to confirm the precedent Diſcourſes.

„ Theſe TORNADO Blaſts were „ ſo *variable*, that ſometimes with- „ in the ſpace of an hour, all the „ *ſeveral Winds* of the *Compaſs* will „ blow; ſo that, if there be many

„ Ships

„ Ships in Company, you shall have
„ them Sail so many several ways,
„ and every one of them seem to
„ go directly before the Wind.
„ These strange Gusts came with
„ much *Thunder* and *Lightning*, and
„ extreme *Rain*, so *noisome*, that it
„ made their Cloaths who stirr'd
„ much in it, to stink upon their
„ Backs; and the Water of these
„ Hot, and Unwholsome Showers
„ would presently bring forth
„ Worms, and other offensive Ani-
„ mals. The TORNADOS met
„ with us, when we were about
„ Twelve Degrees of N. Latitude,
„ and kept us Company, till Two
„ Degrees Southward of the *Æqui-*
„ *noctial*.

This ECNEPHIAS not only visits the Coasts of *Malaguta* and *Guiny*, producing vehement Gusts of Wind and Rain, but reaches as far as *Terra de Natal*, lying to the *East-North-East* towards St. *Lawrence*; and at *Cape Gardafui* near the entrance of the *Arabian Gulf*,

it infeſts thoſe parts in *May*, as was collected by *Varenius* from the *Dutch Journals*: In the Sea towards the Kingdom of *Loango*, and that part of the *Æthiopique* Ocean, the TORNADOS are moſt frequent in *January*, *February*, and *March*. On the Shores of *Guiny*, when no other Winds blow in thoſe Climats, and within Five, Six, or Seven Degrees of the *Æquinoctial*, they reign in *April*, *May*, and *June*, which is the time of their *Rains*; and in other parts of *Africk*, they obſerve other Months; For they have not only *Eteſian Winds*, but *Anniverſary Tempeſts* in ſome Seas. Yet, to be fuller ſatisfied in the Hiſtory of this *Ecnephias*, I addreſs'd my ſelf to *Mr. George Cock* of *Greenwich* (a Gentleman of a Generous and Communicative Temper) who being intereſted in the *Royal Company*, is well vers'd in all Occurrences of the *African* Trade, and at my requeſt procur'd me this following Account of the TOR-

NADOS

NADOS on the Coaſt of *Guiny*, from a Perſon long employ'd in their Service.

„ The place of the TORNA-
„ DOS riſing is, *E. N. E.* to the
„ *N. N. E.* they frequently give 2
„ or 3 hours notice of their com-
„ ing, by a thick black *Cloud* ga-
„ ther'd in the *Horiſon*, with much
„ *Thunder* and *Lightning*. Some-
„ times the *Wind* comes firſt, very
„ forceable, and then a great quan-
„ tity of *Rain*; otherwhile, the
„ *Rain* begins, and is follow'd by
„ a Tempeſtuous Wind. At this
„ Seaſon the *Blacks* count it good
„ Planting Corn, or Roots.

„ They make the *Air* very clear;
„ ſo that a Man may ſee 5 times
„ further than before: I my ſelf
„ lying at Anchor in the River,
„ have ſeen the *Iſle* of *Princes*, at
„ leaſt Six Leagues up; when be-
„ fore, I could not ſee the Iſle of
„ *Fernando do Poo*.

„ During the TORNADOS it's
„ exceeding Cold, inſomuch that
„ the

„ the Natives, and other Inhabi-
„ tants are very ſenſible of it for
„ the time. Their *Continuance* is
„ about an Hour, or two Hours at
„ moſt.

I lately made enquiries of ſeve-
ral Ships, that, during the Winter
Months, never met with any
TORNADOS, all the way from
Braſile; They being moſt violent,
when the *Sun* is near their *Zenith*,
and in the time of their *Rains*,
when the Air is *Moiſt*, and affords
greater Quantities of *Flatulent Va-
pours*. *R. BOHUN of the Origine
and Properties of* Wind, *Pag.* 235.
&c.

Obſerva-

Obſervations concerning ISLANDS.

WE muſt in the firſt place diſtinguiſh between *Original Iſlands* and *Factitious Iſlands*; Thoſe I call *Factitious*, that are not of the ſame Date and Antiquity with the *Sea*, but have been made ſome at one time, ſome at another, by accidental Cauſes, as the Aggeſtion of *Sands* and *Sandbeds*, or the *Sea* leaving the tops of ſome ſhallow places that lie high, and yet flowing about the lower Skirts of them; Theſe make ſandy and plain ISLANDS, that have no high Land in them, and are but mock-ISLANDS in Effect. *Others* are made by divulſion from ſome *Continent*, when an *Iſthmus* or the Neck of a *Promontory* running into the *Sea*, ſinks or falls in, by an *Earthquake* or otherwiſe, and the *Sea* entring in at the gap paſſeth through, and makes that *Promontory* or Country become an ISLAND.

Thus

Thus the ISLAND *Sicily* is ſuppos'd to have been made, and all *Africa* might be an ISLAND, if the *Iſthmus* between the *Mediterranean* and the *Red Sea* ſhould ſink down. And theſe ISLANDS may have Rocks and Mountains in them, if the Land had ſo before. Laſtly, there are ISLANDS that have been ſaid to riſe from the bottom of the *Sea*; Hiſtory mentions ſuch in both the *Archipelago's*, *Ægean* and *Indian*; and this ſeems to argue that there are great Fragments or Tracts of *Earth* that lie looſe at the bottom of the *Sea*, or that are not incorporated with the Ground.

But beſides theſe ISLANDS and the ſeveral Sorts of them, there are others which I call *Original*; becauſe they could not be produc'd in any of the forementioned ways, but are of the ſame Origin and Antiquity with the Channel of the *Sea*; and ſuch are the generality of our ISLANDS; They were not made

made of heaps of *Sands*, nor torn from any *Continent*, but are as Ancient as the *Continents* themſelves, Namely, ever ſince the *Deluge*, the common Parent of them both. Nor is there any difficulty to underſtand how ISLANDS were made at the Diſſolution of the *Earth*, any more than how CONTINENTS were made; for ISLANDS are but leſſer CONTINENTS, or CONTINENTS greater ISLANDS; and according as CONTINENTS were made of greater Maſſes of *Earth* or greater Fragments ſtanding above the Water, ſo ISLANDS were made of leſs, but ſo big always, and in ſuch a poſture, as to bear their tops above the Water. Yet though they agree thus far, there is a particular difference to be taken notice of as to their *Origin*; for the CONTINENTS were made of thoſe three or four primary Maſſes into which the falling *Orb* of the *Earth* was divided, but the ISLANDS were made

made of the Fractures of theſe, and broken off by the fall from the Skirts and Extremities of the CONTINENTS; we noted before, that when thoſe great Maſſes and primary Fragments came to daſh upon the *Abyſſe* in their fall, the ſudden ſtop of the Motion, and the weighty Bulk of the deſcending Fragment broke off all the Edges and Extremities of it, which Edges and Extremities broken off made the ISLANDS; And accordingly we ſee that they generally lie ſcatter'd along the ſides of the Continents, and are but *Splinters*, as it were, of thoſe greater Bodies. 'Tis true, beſides theſe, there were an infinite Number of other pieces brake off that do not appear, ſome making *Rocks* under Water, ſome *ſhallows* and *Banks* in the *Sea*; but the greateſt of them when they fell either one upon another, or in ſuch a poſture as to prop up one another, their Heads and higher parts

parts would ſtand out of the Water and make ISLANDS.

Thus I conceive the ISLANDS of the *Sea* were at firſt produc'd; we cannot wonder therefore that they ſhould be ſo numerous, or far more numerous than the *Continents*; Theſe are the Parents, and thoſe are the Children; Nor can we wonder to ſee along the ſides of the *Continents* ſeveral ISLANDS or Sets of ISLANDS, ſown, as it were, by handfuls, or laid in Trains; for the manner of their Generation would lead us to think, they would be ſo plac'd. So the *American* ISLANDS lie ſcatter'd upon the Coaſt of that *Continent*; the *Maldivian* and *Philippine* upon the *Eaſt-Indian* Shoar, and the *Heſperides* upon the *Africk*; and there ſeldom happen to be any towards the middle of the *Ocean*, though, by an Accident, that alſo might come to paſs. *BURNET's Theory of the Earth*, pag. 137, 138, 139.

Athanaſius

Athanaſius Kircher, amongſt many conſiderable Remarks in his *China Illuſtrata*, tells us, that in *China* there were ſeveral *Iſles*, to the Number of 99. all turned into one, under the ſame Extent of ſpace they had, when they were divided by Water.

As concerning the Situation of ISLANDS, whether Comodious or not, this, ſaith *Peter Heylin*, is my judgement. I find in *Machiavel*, that for a City whoſe People covet no Empire but their own Towns, a Barren place is better than a Fruitful; becauſe in ſuch Seats they are compell'd to Work and Labour, whereby they are freed from Idleneſs, and by Conſequence from Luxury: But for a City whoſe Inhabitants deſire to enlarge their Confines, a fertile place was rather to be choſen than a Barren, as being more able to nouriſh Multitudes of People. The like *Pet. Heylin* ſays of ISLANDS. If a *Prince* deſire rather to keep than augment

augment his Dominions, no place fitter for his Abode than an ISLAND; as being by it ſelf and Nature ſufficiently defenſible. But if a King be minded to add continually to his Empire, an ISLAND is no fit Seat for him; becauſe, partly by the uncertainty of Winds and Seas, partly by the length and tedioufneſs of the ways, he is not ſo well able to ſupply and keep ſuch Forces as he hath on the *Continent*. An Example hereof is *England*, which hath even to admiration repelled the moſt puiſſant Monarch of *Europe*; but for the Cauſes above mentioned, cannot ſhew any of her *Conqueſts* on the *firm Land*, though ſhe hath attempted and atchieved as many glorious Exploits, as any Countrey in the World. *PET. HEIL. Coſmogr.*

The Ingenious *Dr. Sprat*, now Biſhop of *Rocheſter*, obſerves, that the chief Deſign of the *Antient*

Engliſh was the glory of ſpreading their Victories on the *Continent*: But this, ſays he, was a Magnanimous miſtake: For by their very *Conqueſts*, if they had maintain'd them, this ISLAND had been ruin'd, and had only become a *Province* to a greater *Empire*. But now it is rightly underſtood, that the *Engliſh* Greatneſs will never be ſupported or increas'd in this Age, by any other Wars but thoſe at *Sea*. *SPRAT's Hiſt. of the R. S. Pag.* 404.

ISLANDERS are for the moſt part longer liv'd, than thoſe that dwell in Continents; For they live not ſo long in *Ruſſia*, as in the *Oreades*; nor ſo long in *Africa*, though under the ſame *Parallel*, as in the *Canaries*, and *Tercera's*; And the *Japonians* are longer liv'd, than the *Chineſes*; though the *Chineſes* are mad upon long life. And this is no wonder; ſeeing the Air of

of the *Sea* doth heat and cheriſh in cooler Regions, and cool in hotter. *BACON's Hiſt. of Life and Death.*

Of the Origine *of* FOUNTAINS.

THat there is a *Maſs* of *Waters* in the Body of the Earth, is evident from the Origine of Fountains; for the Opinion of *Ariſtotle* imputing them to the *Condenſation* of *Air* in the *Caverns* of the *Earth*, and that of other *Philoſophers* aſcribing them to the fall of *Rain-Water*, received into ſuch *Ciſterns* in the Earth which are capable of receiving it, are both equally unſatisfactory, unleſs we ſuppoſe a *Maſs* of *Waters* in the Bowels of the Earth, which may be as the *Common-Stock* to ſupply thoſe Fountains with. For it is very hard conceiving how *meer*

Air should be so far *Condensed*, as to cause not only such a Number of Fountains, but so great a quantity of Water as runs into the *Sea* by those *Rivers* which come from them, (as the River *Volga* is supposed to empty so much Water in a Years time into the *Caspian Sea*, as might suffice to cover the whole *Earth*,) by which likewise it is most evident, that there must be some *Subterranean Passages* in the *Sea*, or else of necessity, by that *abundance* of *Water* which continually runs into it from the *Rivers*, it would *overflow* and *drown* the World. And from this Multitude of *Waters* which comes from Fountains, it is likewise evident, that the *Origine* of Fountains cannot be meerly from such *Water* which falls from the *Clouds*, which would never suffice to maintain so full and uninterrupted a *Stream* as many Fountains have: Especially if that be true which some assert, that

Rain-

Rain-Water doth never *moiſten* the *Earth* above *Ten Foot deep*, for of far greater *profundity* many Fountains are. And beſides the *Rain-Water* runs moſt upon the *Surface* of the *Earth*, and ſo doth rather ſwell the *Rivers*, which thereby run with greater force in their Paſſage to the *Ocean*, and doth not lodge it ſelf preſently in the *Earth*, eſpecially if it deſcends in a greater *Quantity*, which alone is able to fill ſuch *Ciſterns* ſuppoſed to be in the *Earth*, eſpecially in *Mountains*, which may keep a Stream continually running. Although therefore we may acknowledge that the fall of *Rain* may much conduce to the *Overflowing* and *Continuance* of Fountains, as is evident by the greater force of *Springs* after continued *Rains*, and by the decay of many of them in *hot* and *dry Weather*, (which yet I had rather impute to the *Suns* exhaling by his continued heat thoſe moiſt

Vapours in the *Earth*, which should continually supply the *Springs*, than meerly to the want of *Rain*,) and by the rise of most great *Rivers* from such Fountains which come from the *Foot* of *Mountains*; where the Ground is supposed to be of so hard and consistent a Substance, as Stone, or Chalk, or something of like Nature, which might help to the Conservation of *Water* there, from whence it after ran in Streams to the *Ocean* (which was the great Argument of the Famous *Peireskius* for this Opinion,) although I say, these things may argue thus far, that *Rain-Water* doth much conduce to the Preservation of *Springs*, yet it cannot give a sufficient account of the *Origine* of them: Which with the greatest Reason and probability is imputed to those *Subterraneous Waters* which pass up and down through the Bowels of the *Earth*. Some have fancied the *Earth* to

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be as one *Great Animal*, whose *Subterraneous Passages* were like *Veins* in the *Body*, which receiv'd *Water* out of the *Sea*, as the Veins do *Blood* out of the *Liver*; and that there are some kind of *hot Vapours* in the *Earth* which supply the place of *Vital Spirits*, which are diffused up and down the Body through the *Arteries*. And that as in an *Animal* there are *some* parts which upon the least *Prick* do send forth *Blood*, and *others* are more *Callous* where the *Incision* must be deeper before any *Blood* appears: so it is in the *Earth*, when it is opened in a *right Vein* we find presently a *Spring* of *Water*; but if we chance to hit on a wrong place, we go deep and may find none; not that *Water* is wanting, but we have not hit on the *Veins* through which it runs. And thence as the *Blood* with equal freedom and velocity ascends into the *Head*, as it runs into the

Legs, becauſe it is equally diſpers'd into all the parts from the *Center* of it; ſo in the Body of the *Earth*, it is as natural for the *Water* to aſcend into the *Tops* of *Mountains*, as it is to fall down into the *Center* of the *Earth*. And that it is no more wonder to ſee *Springs* iſſue out of *Mountains*, than it is to ſee a Man *Bleed* in the *Veins* of his *Forehead* when he is let Blood there. So in all places of the *Earth* the parts of it are not diſpos'd for *Apertion*; for ſome of them are ſo hard and compact, that there ſeems to be no paſſage through them (which is the moſt probable Reaſon, why there is no *Rain* neither in thoſe places, becauſe there is no ſuch Exſudation of thoſe moiſt *Vapours* through the *Surface* of the *Earth*, which may yield matter for *Rain*, as it is in many of the Sandy places of *Africa*, but uſually *Mountainous* Countries have more large, and as it were

were *Temple-Veins*, through which the moist *Vapours* have a free and open passage, and thence there are not only more frequent *Springs* there, but *Clouds* and *Rains* too.) Now if this Account of the *Origine* of *Springs* in the *Earth* be as rational as it is ingenious and handsome, (and there is not much can be said against it, but only that then all Fountains should be *Salt*, as the Water is from whence they come) then we easily understand how the *Earth* might be *overflow'd* in the *Universal Deluge*; for then the Fountains of the *Deep* were broken up, or there was an *Universal opening* of the *Veins* of the *Earth*, whereby all the *Water* contained in them would presently run upon the *Surface* of the *Earth*, and must needs, according to its proportion, advance it self to a considerable height. But because the salving the difference of the *Water* in *Springs* from what it is in the

Sea,

Sea is so considerable a *Phænomenon* in our present case, I therefore rather take this following as the most *rational* Account of the *Origine* of Fountains, *viz.* That there are great *Cavities* in the *Earth*, which are capable of receiving a considerable *Quantity* of *Water*; which continually runs into them from the *Sea* (which as it continually receives fresh Supplies from the *Rivers* which empty themselves into it, so it dispatcheth away a like quantity thorow those *Spongy* parts of the *Earth* under the *Ocean*, which are most apt to suck in and convey away the Surplusage of *Water*) so that by this means the *Sea* never swells by the Water conveyed into it by the *Rivers*, there being as continual a *Circulation* in the *Body* of the Earth, of the *Water* which passeth out of the *Ocean* into the *Subterraneous Caverns*, and from thence to the *Mountains*, and thence into the *Sea* again;

again; as there is a *Circulation* of *Blood* in Man's Body from the *Heart*, by the *Arteries* into the *Exteriour Parts*, and returning back again by the *Veins* into the *Heart*. According to which we may imagine such a place in the Heart of the *Earth*, like *Plato's Barathrum*, τῆλε μαλ' ἦχε Βάθυστον ὑπὸ χθονός ἐστι Βέρετρον. As *Plato* in his *Phædrus* describes it out of *Homer*, *a long and deep Subterraneous Cavity*. Εἰς γὰρ τοῦτο τὸ χάσμα συῤῥέουσί τε πάντες οἱ ποταμοὶ, καὶ ἐκ τούτου πάλιν πάντες ἐκρέουσι. *Into which Cavity all the Rivers at last flow, and from which they again disperse themselves abroad.* Now this *Cavity* of the *Earth* thus fill'd with Water, supplies the place of the *Heart* in the Body of the *Earth*, from which all those several *Aquæducts* which are in the Earth have their continual supply; But *that* which makes those passages of Water which we call *Springs* and Fountains properly, I suppose,

is

is thus generated; from those *Cavities* fill'd with *Water* in the *Earth*, by Reason of the *hot Steams* which are in the Body of the Earth, there are continually rising some *Vapours* or little *Particles* of *Water*, which are dis-joyned from each other by the *Heat*, by Reason of which they attain a greater Celerity of Motion, and so pass through the *inner Pores* of the *Earth*, till they come near the *Superficies* of it. Which when they have approach'd to, they are beat back again by the *Cold*, which environs the *Surface* of the *Earth*, or at least are so arrested by the *Cold*, and condens'd by it, that they lose the form of *Vapours*, and become perfect *Water* again. Which *Water* being now more gross, than while it was a meer *Vapour*, cannot descend again through the same *Pores* through which it ascended before, because *these* are not now capable of receiving it: And therefore it seeks

out

out ſome *wider paſſages* near the *Surface* of the *Earth*, by which means it moves in an *Oblique manner*, and is ready to embrace any other *Vapours* which are arreſted in the ſame manner; now when theſe are grown to a Conſiderable *Body* in the *Surface* of a *Mountain*, or a *Plain*, and find a Vent fit for them, there appears a proper FOUNTAIN, whoſe *Streams* are ſtill maintained by the ſame *Condenſation* of *Vapours*, which when they are once come abroad, are in continual *Motion*, whereby *Rivers* are made, which are ſtill finding a paſſage through the *declivity* of the *Surface* of the *Earth*, whereby they may return to the *Ocean* again. Now, according to this Account, that grand *Phænomenon* of the *freſhneſs* of *Fountain-Water*, when the *Water* of the *Sea* is Salt, whence it Originally comes, is ſufficiently reſolved. For meer *Tranſcolation* may by degrees take away that

which

which the *Chymists* call the *Fixed Salt*; and for the *Volatile Salt* of it (which being a more Spirituous thing, is not removable by *Distillation*, and so neither can it be by *Transcolation*) yet such an *Evaporation* as that mentioned, may serve to do it, because it is evident that *Fresh Water* will fall from the *Clouds*, which hath risen from those *Vapours* which have come out of the *Sea*; and besides, these *Vapours* or small *Particles* of *Water* in their passage throw the *Earth* (especially when they come near the *Surface* of it) do *Incorporate* with other *Sweet Vapours*, as those which come from *Rain* and others, by which means they insensibly lose their former *Acidity* and *Sharpness*. But those FOUNTAINS which do retain their former *Saltness*, as there are many such in the World, may very probably be supposed not to have come from these *Vapours condensed*, but to be a kind of a breaking

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ing of a Vein, in which the *Salt-Water* was convey'd up and down the *Body* of the *Earth*. *STILLINGFLEET's Orig. Sacr.* lib. 3. Cap. 4. Sect. 6.

The Opinion of *Mr. Edmund Halley*, in the *Philos. Transact. Numb.* 192. That *Springs* and *Rivers* owe their Original to *Vapours condensed* on the sides of *Mountains*, rather than unto *Rains*, I acknowledg to be very Ingenious, grounded upon good Observations, and worthy of its Author; and I will not deny it to be in part true in those hot Countrys in the *Torid Zone*, and near it; where, by reason of the great heats, the *Vapours* are more copiously exhaled out of the *Earth*, and its likely carryed up high in the form of *Vapours*: But in *Europe*, and the more Temperate Countries, I believe the *Vapours condensed* in the manner as *Mr. Halley* describes, have but little Interest

in

in the producing of their *Springs*. *JOHN RAY's Miscell. Disc. of the Dissolut. of the World*, Pag. 82. and 85.

Dr. Tankred Robinson's *Letter to* Mr. John Ray.

YOU may peradventure meet with some opposition against your Hypothesis of FOUNTAINS, *tho' indeed I am more and more confirm'd in your Opinion of them, and the use of the Mountains.* Father TECHART *in his second Voyage to* Siam, *says, when he went up to the top of the* Table Mountain *at the* Cape *of* Good Hope, *the Rocks and Shrubs were perpetually dropping and feeding the* Springs *and Rills below, there being generally Clouds hanging on the sides near the top.*

The

The ſame Obſervation hath been frequently made by our Engliſh *Merchants in the* Madera *and* Canary Iſlands, *eſpecially in their journeys up to the* Pike *of* Teneriff, *in which, at ſuch and ſuch heights, they were always wet to the Skin, by the droppings of the great Stones, yet no Rain over head; The ſame I have felt in paſſing over ſome of the* Alps. *The Trees, which in the* Iſlands *of* Ferro *and* St. Thomas, *are ſaid to furniſh the Inhabitants with moſt of their Water, ſtand on the ſides of Vaſt Mountains:* Voſſius *in his Notes on* Pomponius Mela, *affirms them to be* Arboreſcent Ferula's; *I believe there is ſomething in the many Relations of Travellers and Voyagers concerning theſe Trees; but then I fancy they are all miſtaken, when they ſay, the Water iſſues out of the Trees: The Vapours, ſtopt by the Mountains condenſe, and Diſtil down by the Boughs. There being no Mountains in* Egypt, *may be one reaſon, why there is little or no Rain in*

that Countrey, and Consequently no fresh Springs; *therefore in their* Caravans *they carry all their Water with them in great* Borracio's. *This may be the cause that the Vast Ridge and Chain of Mountains in* Peru, *are continually watered, when the great Plains in that Countrey are all dry'd up and parcht. This Hypothesis concerning the* ORIGINAL *of* SPRINGS, *from Vapours, may hold better in those Hot Regions within and near the* TROPICKS *(where the Exhalations from the Sea are most plentiful, most rarify'd, and Rain scarce) than in the Temperate and Frigid ones (where it Rains and Snows generally on the Tops of the Mountains) yet even in our* EUROPEAN *Climates I have often observ'd the Firs, Pines, and other Vegetables near the Summets of the* ALPS *and* APPENNINES, *to drop and run with Water, when it did not Rain above; some Trees more than others, according to the*

density

denſity and ſmoothneſs of their Leaves and Superficies, whereby they ſtop and condenſe the Vapours more or leſs. The Beams of the Sun having little force on the high Parts of Mountains, the interrupted Vapours muſt continually moiſten them, and, (as in the Head of an Alembick) condenſe and trickle down; ſo that we owe part of our Rain, Springs, Rivers, and Conveniencies of Life, to the Operation of Diſtillation, and Circulation, by the Sun, the Sea, and the Hills, without even the laſt of which, the Earth would ſcarce be Habitable.

Novemb. 12. 1691.

TANCRED ROBINSON.

Since the Receipt of this Letter, an Experiment occur'd to Me, which hath much confirm'd me in the belief and perſuaſion of the Truth of thoſe Hiſtories and Relations which Writers and Travellers have delivered to us concern-

ing Dropping Trees in FERRO, St. THOME, GUINY, *&c.* of which before I was ſomewhat diffident; And likewiſe in the approbation of the *Hipotheſis* of my Learned Friend *Dr. Tancred Robinſon* for the ſolving of that *Phænomenon.* The ſame alſo induces me to believe, that *Vapours* may have a greater Intereſt in the production of SPRRINGS even in temperate and cold Regions, than I had before thought. Therefore whenever in this Work I have aſſigned RAIN to be a ſufficient or only Cauſe of SPRINGS and RIVERS, I would not be underſtood to exclude, but to comprehend therein MISTS an VAPOURS; which I grant to have ſome intereſt in the production of them, even in Temperate and Cold Regions; and a very conſiderable one in Hot. Though I cannot be perſwaded, that even *there* they are the Sole Cauſe of SPRINGS, for that there fall

fall such plentiful and long continuing RAINS, both in the *East* and *West-Indies*, in the Summer Months: Which must needs contribute something to their ORIGINAL. *JOH. RAY's* Miscell. Disc. *of the* Dissolution *of the* World, *Pag.* 249.

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